Refrigeration Service Engineer

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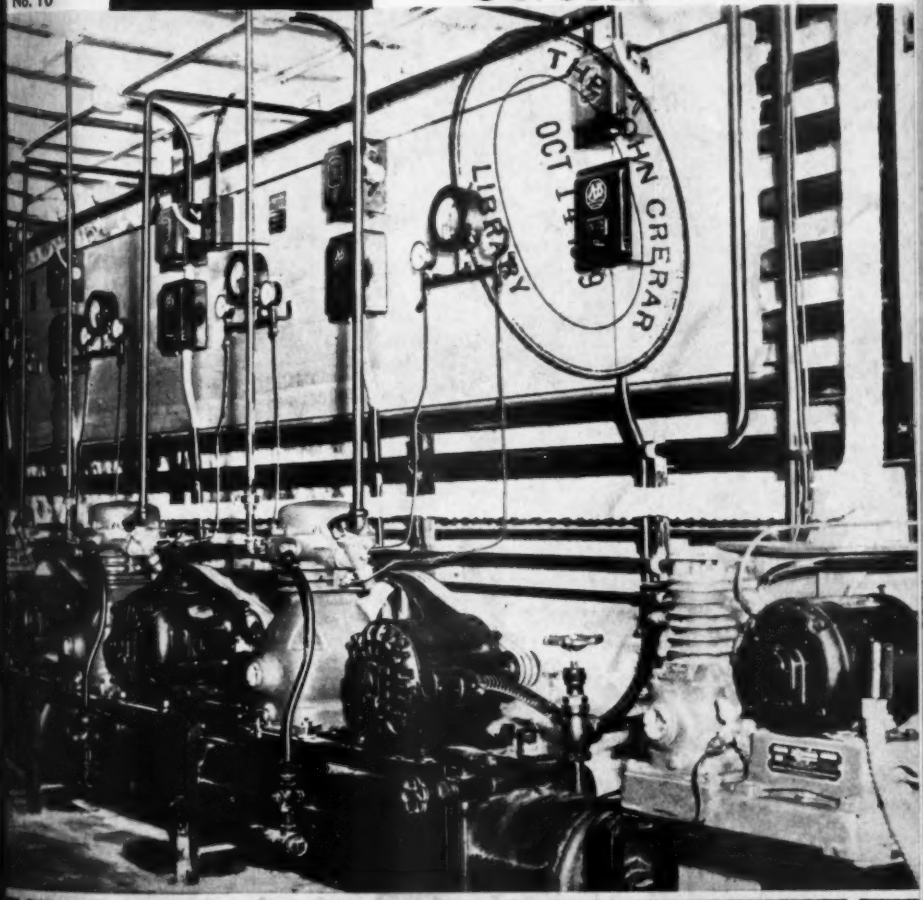

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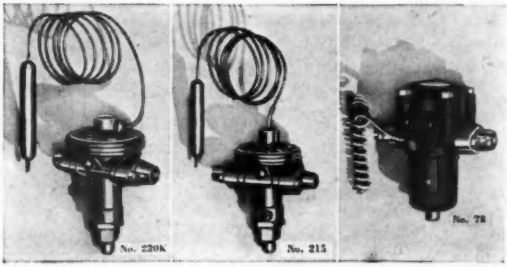

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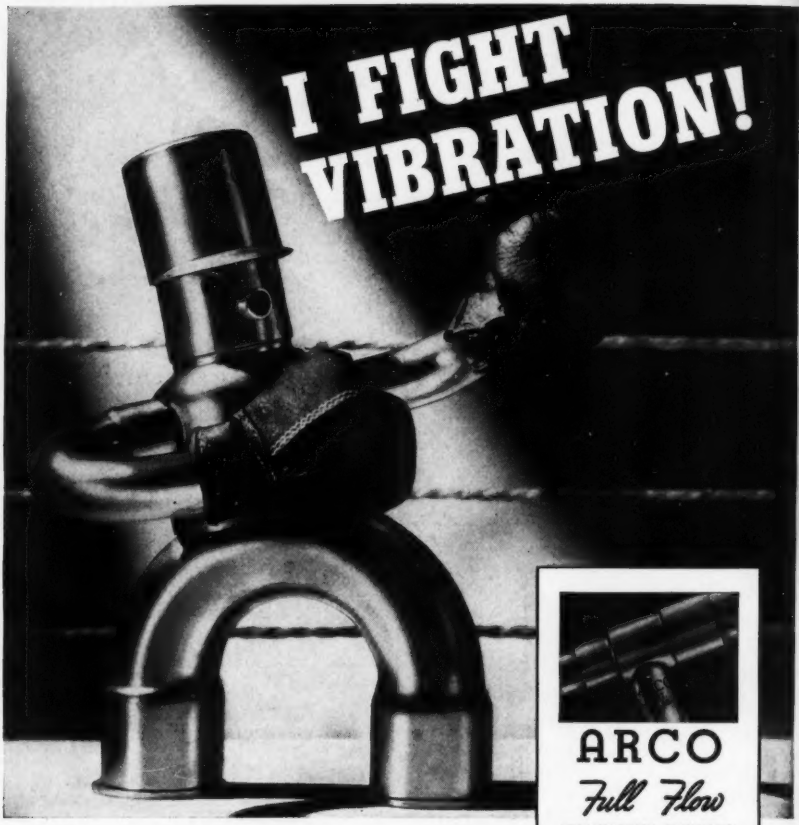

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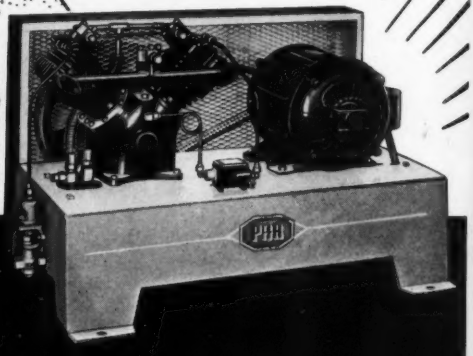

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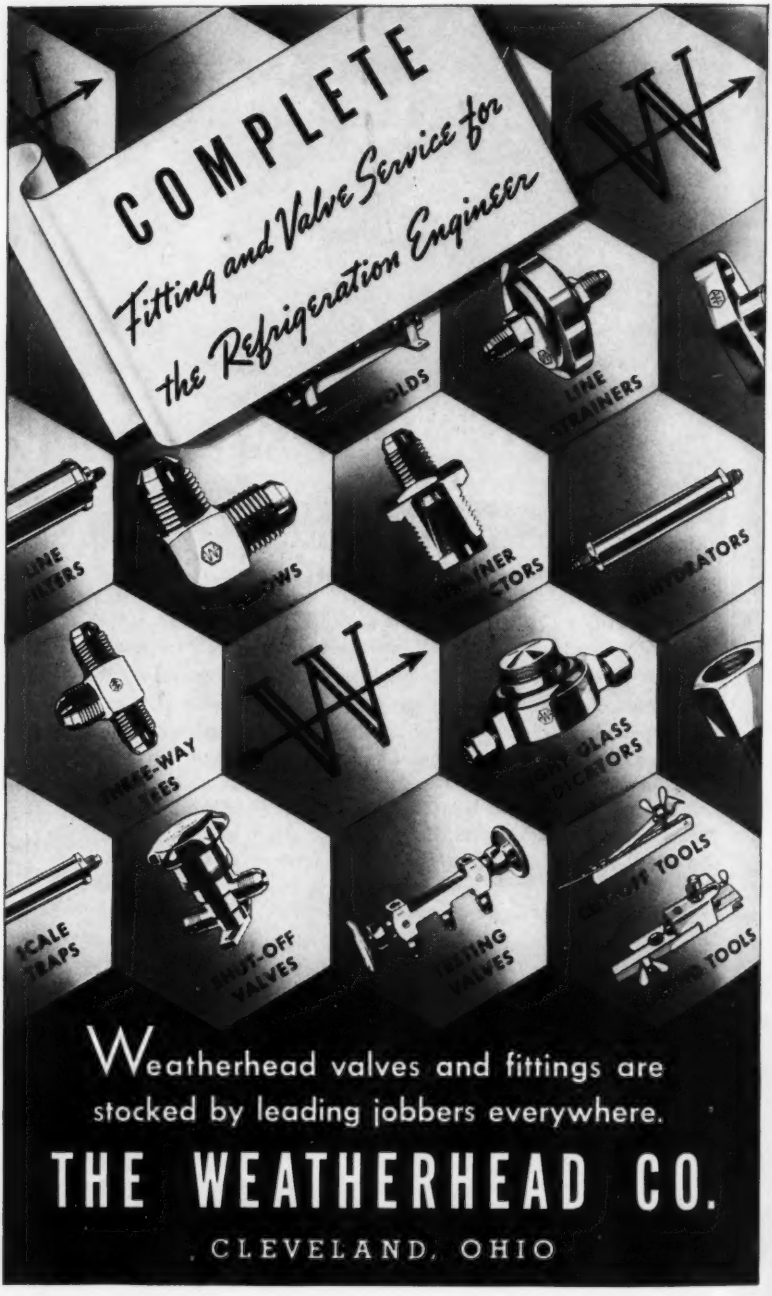
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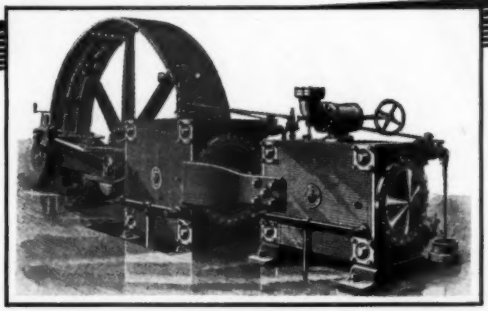

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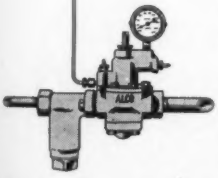

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The Refrigeration Service Engineer

Vol. 7 No. 10

October 1939

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

Official Organ
REFRIGERATION SERVICE ENGINEERS SOCIETY

Cover

This month's front cover shows a very fine example of the use of several smaller machines instead of one large one for the refrigeration requirements of a locker storage plant. The first article of a new series on locker storage appears on page 11 of this issue.

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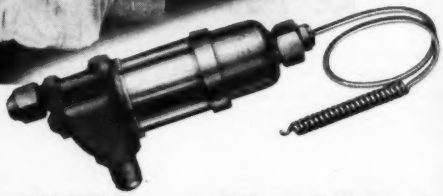
One corner of the charging room where Detroit Thermostatic Expansion Valves are gas charged.



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The Refrigeration Service Engineer

Vol. 7, No. 10 CHICAGO, OCTOBER, 1939 $2.00 per Annum

First Article

The Chemical and Mechanical Aspect of Locker Storage Plants

The author of this new series of articles has had extensive experience in refrigeration service and installation engineering, both in this and several foreign countries. He has treated the subject in a most interesting manner.

By MARTIN G. LANE*

THE subject of frozen foods is such a broad and comprehensive one as to prevent a complete and exhaustive study of it in a few short papers and as far as the chemistry of foods is concerned I will give only general information of proven and practical usefulness, in connection with the handling, packing and freezing of meat, vegetables, fowl, fish and fruits. Acknowledgment is due the United States Department of Agriculture for some of the information that will be given. A more extensive treatment of the application of insulation for these plants, the installation of equipment, its operation, and overhead costs, than is usually given under any subject matter relative to this broad subject is also contained herein. The subject of cold storage is not a new one but its application to locker storage systems relatively is, having reached its present development within the past five years.

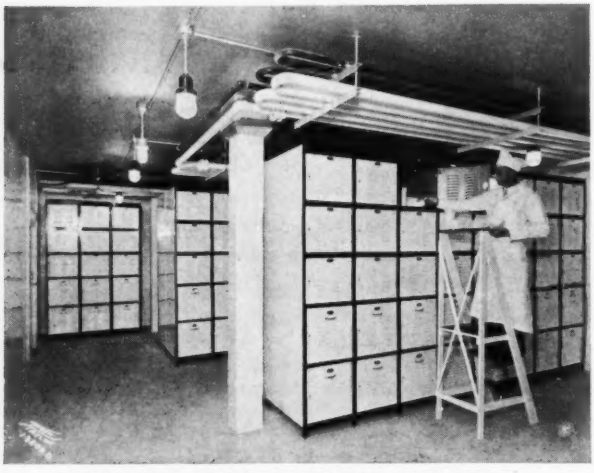
Historically, the storage of food products is not new. The country is dotted with cold storage warehouses which have operated for years in the business of storing a limited number of eggs, dairy products, meat, fowl and fish. The main purpose of these institutions has been to hold this produce for a rising market. Mechanical ice boxes and other types of mechanical refrigerators have been used in the home, restaurant and market for the temporary storage of these products. We should not confuse either commercial cold storage or household refrigeration with locker storage process, because they definitely do not accomplish or serve the same purpose or produce the same results.

The cold storage locker plant process is for the separate and distinct purpose of preserving all kinds of food products by a pro-

* Eureka Engineering Service, Sioux City, Iowa.

cess which not only retains all the natural flavor but in addition goes one step further and actually improves the quality. This means that persons in all walks of life can enjoy fresh meats, fresh vegetables, and fresh fruits the year around regardless of season, without going to the drudgery of canning and without the loss of quality and flavor which naturally occurs in any canning process. As previously stated this development has come within the past five years and has come about through the desire to live better at less cost and less drudgery.

The cold storage locker is here to stay and its development and use in every city and hamlet is practical. The plants are a distinct asset to every community in which they are established and is a sound business proposition for the owners and an economy and benefit to the patrons of these systems. The immediate problem as I see it is to supply the information which will result in the best possible service to the customer and a source of profit to the owners.



View of a typical locker room in a frozen foods plant.

The average locker has a capacity of from 100 to 600 lockers, each an individual freezer box by itself. The plant may contain in addition a storage for dairy products and liquids, a chill room, a butcher or cutting room and sometimes a freezer room for ice cream and ice cream products. All these rooms except the cutting room should be heavily insulated and equipped with large refrigerator doors. The cutting room is the work room of the plant and in it all the cutting is done, also the wrapping up of the cut product into such packages as the various size families may use during any particular period. From the cutting plant the wrapped packages go to the freezer and storage. Most plants have an expert butcher in charge of this section. The chill room is maintained at a temperature of from 32 to 34 degrees Fahrenheit. This room is used largely for the chilling and proper aging of meat products immediately after butchering or delivery to the plant. It is also used for temporary storage of certain meat products and for the storage of vegetables and fruit pending their use or preparation for freezing. The freezer room is maintained at a temperature at from 4 to 10 degrees below zero. All products are placed in this room after preparation for the purpose of quick freezing before being placed in the individual lockers. The locker room is maintained at a temperature of between 12 to 15 degrees above zero. This room contains the batteries of lockers and all products are taken from the freezer and placed in the lockers for permanent storage. Each locker has a separate locking device and each patron has his individual key. The individual lockers may vary in size according to the desires of any particular family to provide sufficient storage for their needs or the lockers may be all of a uniform size and the larger users will in that case rent several lockers. They are usually rented by the year or such other periods as may be customary at that particular plant. There are no additional charges except a small charge per pound for the cutting, wrapping and freezing of meats and other products which are brought to the plant not properly prepared for storing. In the past year some of these plants have expanded their facilities to include butchering, lard rendering and

the smoking and curing of meats.

Families using the facilities of the locker storage system find that their food costs have been nearly cut in half. Better cuts of meat can be had at a lower cost. To the farmer this service means that he can keep his entire summer's supply of meat in storage, his garden vegetables can be preserved with full fresh flavor. The cold storage means that corn on the cob, watermelon and other tempting foods can be available in fresh form at any time during the year.

The preserving effects are possible at subfreezing temperatures, because the freezing process stops or arrests the development of molds, yeasts and bacteria. Freezing temperatures further retard chemical changes such as oxidation and dehydration. There is very little bacterial activity under freezer storage.

It will not be possible to give a full and comprehensive direction to the preparation of products for this type of service, but the refrigeration man should have a working knowledge of the processes in order that he may intelligently understand the problems that must be met and be able to talk intelligently to the owner and operator of such a plant. By knowing the processes he will become more capable of making recommendations for such a plant and gather knowledge of further possible applications to this vast and growing branch of refrigeration.

A typical arrangement of the quick freezing room. The foods rest directly on the refrigerant coils which are arranged in shelves.

First we will take up meats generally and beef to start with. A good beef animal should have a blocky, square and compact form. The animal should conform to a rectangular block. Look for a smooth coat and thin, smooth, loose skin. A thick skin indicates poorer quality. The finish should be smooth, free from protruding bones and fat humps. If an animal has a finished appearance and a straight top line and underline, a deep body and good fleshing qualities it should process into good meat cuts. A good beef animal should have been well fed on corn, molasses or other protein foods for at least eight weeks prior to killing for tender, good tasting meat.

The standard classes of market beef are are follows: *Steers*—prime, choice, good, medium, common and cutters. *Cows*—choice, good, common, cutters and canners. *Heifers*—prime, choice, good, medium, common, cutters and canners. *Bulls and stags*—choice, good, medium, canners and cutters.

Beef can be of quality in almost any weight from 500 to 900 pounds dressed weight and about 40 to 50 percent higher on the live weight. Smaller beef is immature and comes under the veal class. Heavier beef is likely to be tough and stringy and is not recommended for locker storage process. A 500-pound carcass would probably give the best results for locker patrons.

In meats as well as other products that are to be frozen, it is true that the quality of the thawed product depends largely on the fresh material that is frozen. Best cuts of meats come from those that have a good covering of fats. When animals get this covering of fat on the outside the amount of marbling or streaks of fat within the lean part of the meat is increased. Calves can be fattened in 180 days and two-year-olds in 90 days. The product is not only of a better flavor and more tender, but it is more palatable and has a higher nutritive

value. An animal that is to be slaughtered should always be improving in condition rather than going down in condition. The locker storage manager can provide for the wholesale purchase of beef in quarters if the patron has no source of supply.

Butchering is an art and can only be learned by observation and practice. Very few operators will be called upon to do a job of butchering, but it is not a bad thing to know how to do. The main requisites are a clean and sanitary place to butcher, a place to keep the animal from getting excited immediately before the kill, and proper sticking after the animal has been rendered a stunning blow near the center and just below the horn lock. The animal should have been starved for 24 hours prior to slaughtering, but given plenty of water to clean out the digestive tract as much as possible. Avoid all rough handling or pounding or bruising in driving and transporting the animal. A beef bruises easily and cannot possibly heal in time to give a good carcass. A bruised carcass creates waste and greatly reduces its money value. Any undue fatigue or excitement will cause the animal to turn a dark, deep red color, which should be avoided. Anabolism, or slowing up of the circulation, takes place, preventing the blood from draining the resultant impurities and also does not allow the animal to bleed freely and thoroughly.

Preparation Before Freezing

After the slaughtering the animal should be skinned, drawn and quartered, after which it should be delivered and hung in the chill room of the locker storage system. This room will be maintained at a temperature of from 32 to 34 degrees Fahrenheit. The animal should hang here for three days to three weeks, depending on the quality of the meat. A fat hind quarter of beef will be best if allowed to hang in the chill room for three weeks. A lean front quarter will have chilled and cured sufficiently in three days. The variance between the two will be determined by the plant manager.

In this part of the country, a side is generally quartered with the 13th or last rib on the hind quarter to help the loin retain its form and texture. One rib on the hind quarter divides the side more evenly as to weight. Much valuable information may be obtained from the U. S. Bureau of Agriculture in the form of charts showing the various cuts and their names. After this aging process the meat is removed to the cutting room and cut into pieces as requested by the patron and wrapped well in a moistureproof parchment paper before freezing. Oil paper or cheap ordinary wrapping paper will not be satisfactory and will not prevent undesirable drying. The packages of cut and wrapped meat should then be placed in the quick freezing room where the temperature is held from 4 to 10 degrees below zero.

Beef may be satisfactorily stored for a period of twelve months. Dating cuts of meat proves beneficial in helping to remove the oldest cuts of meat first and keeping a record of the length of time the cuts have been kept in the locker storage. Ground beef (hamburger) should be placed in small containers or packages suitable for family use, do not freeze in large containers since this practice will make it hard to remove amounts as required by the patron.

Other Meats

Pork: The process of slaughtering will not be gone into and it is assumed the animal has come to the chill room. The fresh pork should be hung in the chill room immediately after butchering. The period of time for chilling is from 5 to 6 days. This will vary according to the quality of the pork. The general procedure for the handling and cutting of pork, wrapping and freezing is the same as beef. The storage of pork for a period of longer than 6 months is not recommended. Hams and bacon are often frozen to prevent molds and infestation by insects. It also has a tenderizing effect on the smoked meat. Sausage should be handled the same as hamburger in the beef process and for the same reasons.

Lamb: Lamb is especially improved by the aging and freezing process which is only possible in locker storage systems. The same procedure is followed as in the handling of beef.

Fowls: Chickens, Geese, Ducks and Turkeys: Immediately after killing, fowl should be well picked and cleaned on the outside surface. Do not singe or draw the fowl or in any manner open the body cavity.

There is danger of rupturing the intestines and scattering the contents over the flesh and exposing the flesh to the air. Some patrons prefer that the fowls be drawn before chilling and freezing, however it is better not to do so until after they are chilled. It is essential that all animal heat be removed from the carcass as soon as possible

after the kill. If this is not done, bacteria and enzymes will develop and injure the flavor and appearance of the fowl. Chilling properly at 32 degrees above zero prevents greening of fowl caused by a change in the hemoglobin of the blood due to the action of hydrogen sulphide produced by the bacteria. Do not chill fowls below 32 degrees, because the hardening of the outer layers and the congealing of the juices in the muscular fibers prevent the circulation necessary for transferring the interior heat to the surface for radiation. Twelve to 24 hours are necessary for properly chilling the fowl at 32 degrees Fahrenheit. The fowl should then be drawn and wrapped in parchment paper, sent to the freezing room and from there to the locker storage until used.

Fish: Fish should be prepared as for table use. Then wrap them tightly in parchment paper for freezing, or a method that is used very much is as follows: Fish freezes at zero degrees or below. Unless the fish is carefully protected it loses weight rapidly up to fifty or sixty percent in a few months. Drying out can be prevented by "glazing" (dipping the frozen fish into cold water which freezes, coating the fish with a transparent film of ice) and by wrapping in a special moistureproof paper can be stored for a long period even up to nine months without any loss in weight or change of flavor.

When the forementioned products are removed from the locker storage plant for use they should be placed in the home refrigerator where they will keep for several days and will properly thaw. If this process is not followed all the above products should be cooked as soon as possible after removal from the plant, allowing them to thaw in the cooking process. The time required to cook is slightly longer from the frozen state than from the thawed state.

The question of vegetables brings into question a great variety of food. There are 23 different vegetables now carried in locker storage systems and a few words in general to cover most vegetables and fruits will be sufficient. All vegetables intended for frozen pack should be scalded or blanched before packing. This scalding or blanching inactivates the ferments responsible for the deterioration of quality, which may occur even at low temperatures. Scalding sets the characteristic color of the vegetable and makes

TABLE I—PREPARATION OF VEGETABLES AND FRUITS

Product	Preparation	Type Container	Packing	Freezing Temp.	Storage Temp.
Asparagus	Sort, wash, trim and scald 2 to 3 min., cool.	Airtight glass containers.	In Brine, use 4 teaspoons salt 4 cups water.	−15°	+15°
Beans—Green and Wax	Wash, sort, snip and scald 5 minutes. Cool rapidly.	Airtight or non-airtight.	In Brine or Dry 4 teaspoons salt. 4 cups water.	0°	+15°
Cabbage	Remove outer leaves and wash.	Wrap in parchment paper.	Directly in locker.	+15°	+15°
Sweetcorn	Husk and wash.	Airtight or non-airtight.	Brine or dry. 4 teaspoons salt. 4 cups of water.	0°	+15°
Mushrooms	Trim, scald for 2 to 3 min. Cool promptly.	Airtight	Without brine.	0°	+15°
Peas	Shell, scald 2 to 3 min. Cool promptly.	Airtight.	Without brine.	0°	+15°
Sauerkraut	Same as for canning.	Airtight.	Original brine.	0°	+15°
Apricots	Wash, sort, pit. Peeling not necessary.	Airtight.	In Syrup. 4 cups sugar. 4 cups water.	0°	+15°
Blueberries	Sort and wash.	Airtight or non-airtight.	In syrup as above.	+15°	+15°
Cranberries	Sort and wash.	Airtight or non-airtight.	In syrup or dry. 5 cups sugar. 4 cups water.	+15°	+15°
Watermelon	Cut in desired shape.	Airtight or non-airtight.	Parchment paper or airtight container.	0°	+15°

The question of vegetables brings into question a great variety of food. There are 23 different vegetables now carried in locker storage systems and a few words in general to cover most vegetables and fruits will be sufficient. All vegetables intended for frozen pack should be scalded or blanched before packing. This scalding or blanching inactivates the ferments responsible for the deterioration of quality, which may occur even at low temperatures. Scalding sets the characteristic color of the vegetable and makes

packing more easily done. Vegetables which oxidize with consequent deterioration of color and flavor, should be protected as much as possible from atmospheric oxygen throughout the preparing, freezing and storage. For the housewife a good book or bulletin on the preparation for cold pack should be obtained. For general information the schedule in Table 1 is given.

In cases where fruits and vegetables are packed in brine or syrup be sure to allow one-half inch to one inch head space in the containers to allow for expansion in the freezing process. For glass containers the lids should be left open until the content is frozen and then tightened.

Effect of Freezing on Foods

All frozen fruits should be thawed gradually, preferably by taking them from cold storage and holding in the home refrigerator. Fruits should be used as soon as possible after they have thawed to a degree where they can be eaten. Everyone must eat but the average person eats because he likes to, which after all is a very good reason. Nutrition for the normal healthy person is taken care of if the meals provide a well selected variety of foods, which we can eat for both nutrition and enjoyment at the same time. You might ask, "Are frozen foods adequate from the nutrition standpoint?" "Does the freezing affect the food value?" Frozen foods are equal in nutritive value to the same foods prepared in any other way. Frozen foods can retain their natural flavor to a greater degree than foods preserved under any other known method man has so far found. It is a study that is well worth the effort that any person undertakes and at present we are merely in the experimental and infancy stages of it. What the next five years will bring forth one can only guess. To study it is to be prepared for the advances that are sure to come since the world does not stand still and we do progress.

Having covered in a general way the purpose of a quick freezing locker storage system, we are now ready to advance to the subject of equipment and the fundamental requirements necessary in the selection of such equipment. This is a broad and comprehensive study and the proper or improper selection will determine whether a plant is a success or a failure.

Too many times the locker storage system is the result of a promotion scheme engineered by a sales representative whose only object is to make or create sales. He is equipped with a batch of empirical data based on what could be accomplished if everything was just so, but since such a thing cannot be in the affairs of any business, the sale of such equipment under such conditions will miss more times than it hits and quite soon the plant is ready for a great number of changes, that would not have been necessary had a first class heat engineer been called in, who was versed in the practical application of heat gain and heat loss equipment, and also had a general idea from practical experience of what might be expected to occur in the operation of the plant. There are so many variables in a subject of this nature that they cannot all be fully covered, but a line can be directed that will intimate such possibilities. I have in mind a plant just a short way from Sioux City that was a pure sales promotion. It never worked. Further sales representatives were called in and more equipment sold, still it did not work. Finally an engineering firm was called in and the installation changed around and corrected. The plant went to work and is now giving satisfaction. However, much loss could have been prevented had this been done to start with, much dissatisfaction and complaint could have been dispensed with. The sales organization of any firm is a most important thing, but it should be supported by a sound practical engineering staff and such a staff should not be first year college men or even five-year men, but rather men who have at interest the problem at hand and who have not only had the technical training, but also the experience in installation and most of all the actual operation experience. The operator of any plant is a fine fellow to get acquainted with. He may not always know just why a certain thing is or does a certain thing, but he knows when he is not getting results and he has his suspicions, so cultivate him.

The Refrigerating Plant

If we have a room which we desire to keep at a temperature of 15 degrees we place pipe coils along the ceiling. Warm air is lighter than cold air and will rise to the ceiling. By evaporating refrigerant in these coils at a temperature less than 15 degrees, heat will be caused to flow to the cold surface of the pipe. In order that the temperature may be held at a low level inside

of the coil, the vapor must be removed as fast as it forms so as to hold the pressure in the coils constant. If a lower temperature is necessary the pressure will have to be lower. The main purpose of the compressor is to act as a pump to pump the vapor out of the evaporator as fast as the vapor forms. From this it is reasonable to believe that there is a direct relation between the displacement of the compressor and the volume of vapor that must be removed. There is also a relation between the volume of vapor, the amount of heat dissipated, the amount of heat absorbed, and the temperature and pressure in the evaporator. These relations are very important and too much time cannot be spent in digesting them. Too often, where one has a table of capacities to refer to for the selection of apparatus reason is dispensed with on the part of the salesman and an assumption made that may be right, but can be wrong which is often the case. I shall discuss this in a more concrete manner in some illustrative calculations later.

The compressor raises the pressure of the refrigerant vapor and discharges it into a heat exchanger called the condenser. At the higher pressure the vapor can be condensed at ordinary room or water temperatures by removing the latent heat, the superheat and later some of the sensible heat. The condensed liquid is then passed back to the evaporator through a pressure regulating valve commonly called an expansion valve, although other types of valves may be used under proper conditions, and the process is repeated as long as the compressor is drawing the low pressure vapor out of the evaporator.

(To Be Continued in the November Issue)

How to Tune Up Air Conditioning Installations

By Floyd M. Mayse*

ONE of the best means of eliminating trouble and keeping air conditioning maintenance expense to a minimum is the systematic inspection and preparation of the installation for proper operation each season. Sufficient time should be given the job to cover the various points outlined here.

Water Group

WATER PIPING—Check for leaks; piping disconnected for water drainage. *Remedy*—Replace leaky pipes; reconnect.

DRAIN PAN AND WATER SUMPS—Check for clogging, dirt. *Remedy*—Clean and flush out drain pans, water sumps, and drain connections. Lead and paint over with asphaltum paint all metal drain pans and water sumps. If a sump is made of wood, it should be cleaned thoroughly with water and after drying painted with two coats of hot linseed oil.

SPRAY NOZZLES—Check for dirt, proper settings. *Remedy* — Clean and adjust, whether on a cooling tower, evaporative condenser, or an air washer type system.

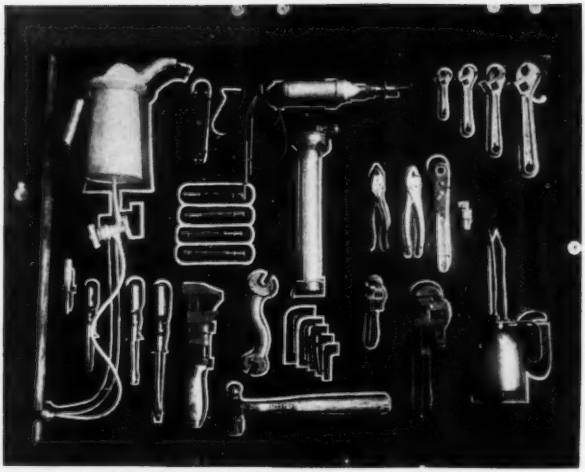
WATER PUMPS—Check for worn parts; leaky packing. *Remedy*—Should be disassembled, cleaned, and the worn parts replaced. Repacking is also recommended.

WATER VALVES—Check for dirt, worn parts. *Remedy*—Whether hand operated or automatic, water valves should be disassembled, cleaned, and worn parts replaced. Adjustment and operation should be checked before replacing in their final location.

Air Group

AIR DISTRIBUTION—Check for adjustment. *Remedy*—Adjust system. Set discharge grilles to obtain the best air distribution as determined by a smoke bomb test.

* Air Conditioning Service Engineer, Westinghouse Electric & Mfg. Co. Reprinted from Heating, Piping and Air Conditioning.



A typical tool board for air conditioning adjustment.

OUTSIDE AIR DUCT—Check for dirt. *Remedy*—Duct and its intake grille should be cleaned of dirt and trash. The outside air damper should be adjusted; it should be located where clean air will be drawn into the building at all times.

OTHER DUCT WORK—Check for air leaks, damper adjustment. *Remedy*—Repair air leaks and noises; adjust splitter dampers for correct air delivery into the branch ducts.

AIR FILTERS—Check for dirt or wear. *Remedy*—Whether in the outside air or return air to the units, filters should be cleaned or replaced as required.

AIR DAMPERS AND DAMPER MOTORS—Check for looseness, noise, operation. *Remedy*—Tighten and adjust.

FANS—Check for proper rotation, smoothness, lubrication. *Remedy*—Make necessary changes for proper rotation, looseness, and smoothness of operation. Fan bearings should be lubricated and aligned, if of the alignment type.

BELTS—Check for adjustment, excessive wear. *Remedy*—Compensate for wear and adjust. Set pulleys for proper alignment and tightness to minimize the wear on the belts and motor shaft.

Refrigerating Group

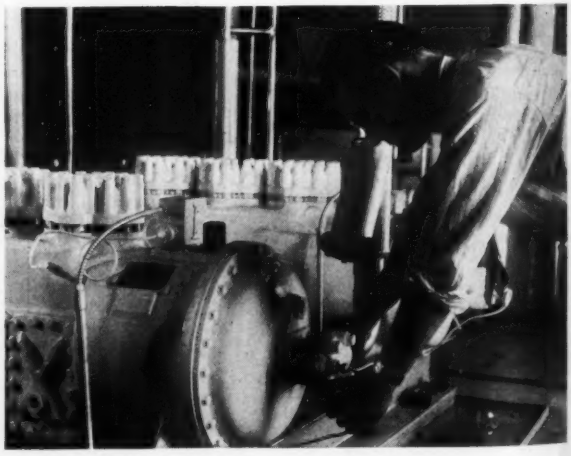
STRAINERS — Check for dirt, wear. *Remedy* — Whether water or refrigerant, strainers should be disassembled, cleaned, and replaced if necessary.

COILS — Check for dirt. *Remedy*—Clean heating and cooling coil surfaces by using water and either a stiff wire brush or a flexible metal bristle brush. Most of the dirt collected on the transfer surfaces will be found on the air inlet side of these coils.

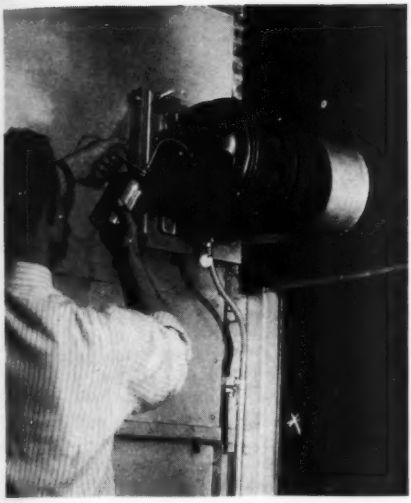
Check for Refrigerant Leaks

EXPANSION VALVES—Check for sluggish operation and improper adjustment. *Remedy*—Replace valve; adjust for proper superheat.

REFRIGERANT VALVES—Check for tightness,



Opening valves before starting the equipment.



Oiling motors.

proper operation. *Remedy*—Adjust for positive closing and repack if necessary. If packless type valves are used, they should be replaced if found to be leaking through the diaphragm.

Refrigerant Piping—Check for leaks. *Remedy*—Refrigerant piping should be leak tested with both halide torch and soap bubbles under 150 lb. per sq. in. "Freon" pressure. Repair leaks.

Refrigerant Quantities—Check for proper amounts. *Remedy*—After the system has been in operation for approximately one hour, refrigerant quantity may be determined by a sight flow indicator installed in the liquid line.

Refrigerant and Water Pressures—Check for proper values. *Remedy* — Install gages in the suction and liquid line of the refrigerant system and on the suction and discharge side of the water pump of the water system.

Compressor — After it has been started, check for oil quantity, oil pressure, and any irregular noises. *Remedy*—Make required repairs.

Condenser Water Tubes—Check for scale deposit. *Remedy*—Clean any accumulated scale and water deposits. Some condensers may require cleaning by use of a recommended acid solution. For shell and tube type clean by standard wire tube cleaner.

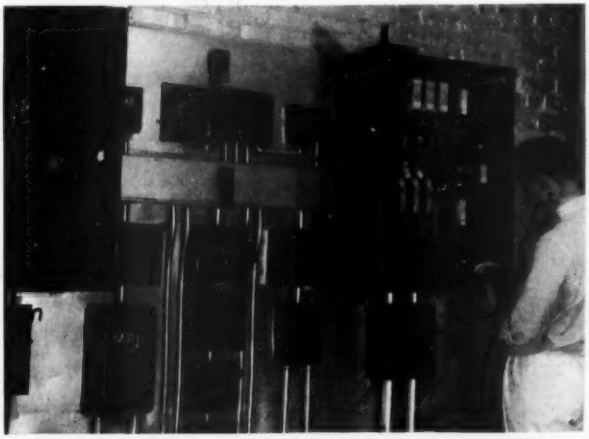
Condenser Water Connection — Check for improper connection. *Remedy*—Connect for either parallel or series hook-up, as determined by the local conditions.

Evaporative Condensers—Check for rust, dirt, scale. *Remedy*—Clean off rust, clean the finned condenser coils of all scale, dirt, and water deposits and paint the interior, including the fans and fan shaft, with an asphaltum paint with a finish coat of aluminum. Discharge duct should be cleaned of rust and repaired where necessary.

Electrical Group

Motors—Check for voltage and current, lubrication, direction of rotation, dirt, excessive noise, wear. *Remedy*—Open type motors should be oiled, and dirt and lint removed from inside the end bells. Bearings, windings, commutators, brushes, leads, end play and terminals should be replaced or repaired where necessary. Connections in the terminal box should be tight and well insulated. Worn commutators on dc drives should be sanded or turned.

Wiring—Check for incorrect wire size,



Checking the electrical equipment.

loose connections, frayed insulation. *Remedy*—Tighten connections, replace worn wiring.

Fuses—Check for improper size. *Remedy*—Replace with correct size.

Switches—Check for loose connections, worn parts. *Remedy*—Tighten connections.

Line Starter and Relay—Check for operation, contact pitting, proper overload setting, damaged arc boxes. *Remedy*—Smooth contacts if necessary, adjust relay, replace broken arc boxes.

Control Circuits—Check for broken wiring, loose connections, improper settings. *Remedy*—Tighten and adjust each control and safety device.

General Group

Insulation—Check for leaks, deterioration. *Remedy*—Tighten and repair.

Foundation—Check for sagging, excessive vibration. *Remedy*—Repair.

Cleaning and Painting—Check for appearance, deterioration. *Remedy* — Wash and clean with a non-explosive solvent to remove grease and dirt. Equipment and all connecting lines should be painted in such a way as to make them stand out from all nearby machinery and building fixtures. In some cases it may be advisable to paint the floor and surrounding walls.

After the installation has been fully gone over, it is advisable to operate the system, rechecking the controls, interlocking devices, noises, water, air delivery, etc. After the system has operated normally for approximately five or six hours, it is advisable to run a capacity check on the complete system.

INDIVIDUAL HOME STORAGE LOCKER

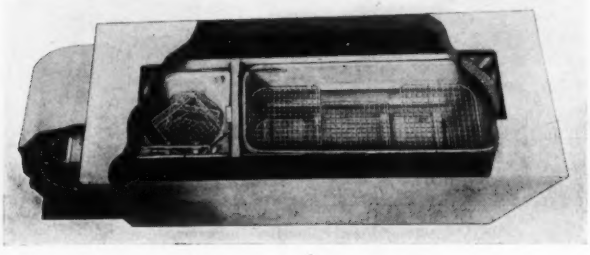
A NEW refrigerated chest for low temperature freezing and storing of foods has been manufactured by Emil Steinhorst & Sons, Inc., Utica, N. Y. These chests have been designed chiefly to augment the service rendered by cold storage locker plants. Many patrons find the time consumed in going to and from the locker plant a disadvantage and for them this chest can be used as an auxiliary locker in their own homes. They are built of heavy gauge copper bearing galvanized steel, protected by a special primer coat and covered with two coats of lacquer in an attractive gray suede color. Standard models have white baked enamel tops, but polished stainless steel tops are available, if desired. The refrigerating machine and controls are concealed under a streamlined ventilated hood. Machine and controls can be reached by lifting off the hood. They can be operated by any standard make of refrigerating machine.

Five 10 by 10 by 3 in. wire baskets in the freezer well, each holding from five to ten pounds of packaged foods, are arranged in criss-cross fashion, which keeps the packages from touching the freezer walls and insures a constant blast of sub-zero air under and around the foods to be frozen, from an electric fan in the end of the chest.

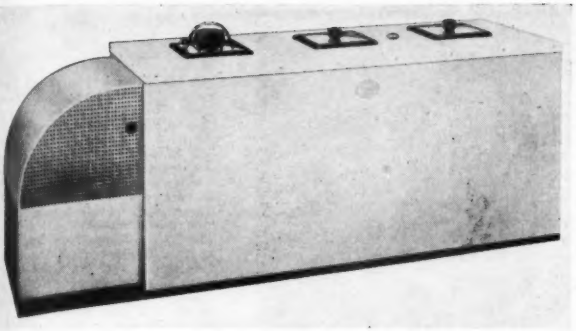
The heavy copper refrigerating coils are built into a heavy metal plated shell, separated from the inner cabinet wall enough to allow full circulation over the coils and metal shelf. The refrigerating shelf and coils can be removed without disturbing the cabinet walls. From 250 to 750 lbs. of food, depending upon the size model can be stored in the food compartment. Storage shelves are of cadmium plated wire with the lower shelf raised from the bottom to permit free circulation of air. It is equipped with an adjustable temperature range permitting temperatures down to minus 15° F.

Foods stored in the storage compartment can be removed easily through convenient entrance holes which permit only a minimum of air to enter when lids are removed. The lids are of sanitary semi-hard rubber and fit into special collars which prevent frosting and the entrance of heat into the chest.

The chests are insulated with five inches



Cut-away view showing interior arrangement of new home storage locker



New Zero-Temp. 10 degree chest for home freezer storage

of corkboard in the walls and bottom, and four inches in the top, set in hot hydrolene cement. There is no wood framing or supports in the cabinet body, only corkboard encased between steel walls. The outer and inner walls are of heavy gauge copper bearing galvanized steel with all seams locked and soldered.

While the manufacturers do not offer this chest as anything new in basic principles of refrigeration, they feel that the idea of going direct to the farm and city home with a practical, miniature, fast freezing apparatus is a new innovation. While no attempt is being made to replace the cold storage locker plants or the domestic refrigerator, the company is of the opinion that it has its place in the refrigerating industry, augmenting the locker plants and domestic refrigerator to the extent of giving better service in the home, as well as providing better foods at all seasons of the year. This company has manufactured and developed types of insulated cabinets for use with mechanical refrigeration and ice for many years, such as milk coolers for farms, brine tanks, etc. So in producing this cabinet, it is augmenting its line with a product which is in keeping with the times.

THE ELECTRIC MOTOR OF TOMORROW FIBERGLAS INSULATED

A DEMONSTRATION of the superiority of glass fiber as insulation for motors is attracting much attention at the New York World's Fair. Sponsored by Owens-Corning Fiberglas Corporation, the exhibit is called, "The Electric Motor of Tomorrow," and is on display at the Glass Center building.

A completely Fiberglas-insulated motor in a standard (No. 254) five horsepower frame size is shown in the exhibit delivering, consistently, the same power as a standard (No. 324 frame size) cotton-wound ten horsepower motor opposite.

The exhibit demonstrates that Fiberglas insulation permits a substantial reduction in size and weight of motors. It also demonstrates that motors with such insulation may be operated at higher temperatures than motors with other types of insulation.

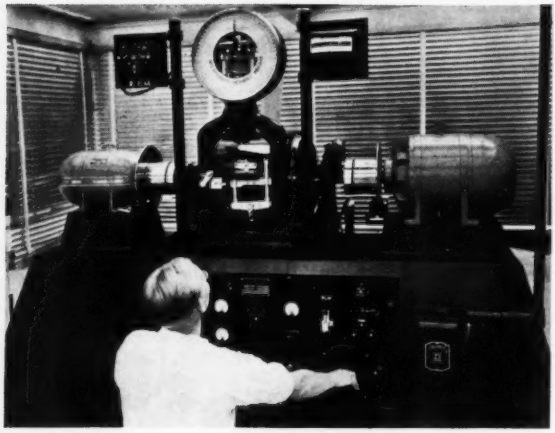
The exhibit offers evidence that the rating of many motors using Class A insulation could be increased from 50 to 100 percent with the aid of glass insulation.

The two motors in the exhibit are hooked up to a dynamometer through a coupling and the load may readily be alternated between one and the other. The gauges show that the small motor, which is some 160 pounds lighter in weight and 45 percent smaller in volume, will develop the same power as the larger standard motor and, at the same time, possesses the same or a superior amount of stamina.

The smaller motor weighs 190 pounds as compared to a weight of 354 pounds for the larger motor. Both are 3-phase, 60-cycle, squirrel cage induction, 220/440 volts at 1730 r.p.m. The frame size of the Fiberglas motor is No. 254—standard for a five horsepower motor—and the frame size of the larger motor is No. 324—standard for a ten horsepower motor.

Greater Temperature Rise in New Motor

There is a marked difference in the temperature rise between the standard motor and the Fiberglas-insulated motor at full load. This temperature rise at full load is 55 degrees Centigrade in the standard motor, whereas the smaller Fiberglas-insulated



"The Electric Motor of Tomorrow" exhibit at the New York World's Fair. A completely Fiberglas-insulated motor in a standard (No. 254) five horsepower frame size is shown at the left delivering, consistently, the same power as the standard (No. 324 frame size) cotton-wound ten horsepower motor at the right. The two motors are hooked up to a dynamometer through a coupling and the load may readily be alternated between one and the other. The gauges show that the small motor, which is some 160 pounds lighter in weight and 45 per cent smaller in volume, will develop the same power as the larger standard motor and, at the same time, possesses the same or a superior amount of stamina.

motor permits temperature rise to 100 degrees Centigrade at full load.

Because the commonly used types of organic insulation—such as cotton, silk, and paper—rarely permit a rated temperature rise greater than 55 degrees Centigrade, it is obvious that the insulation of the standard motor would soon burn out if the motor were run at the higher temperature of the smaller motor.

"The Motor of Tomorrow" has its stator coils wound with glass-insulated magnet wire and taped with Fiberglas tape. The stator slots are lined with an insulation made of a combination of mica splittings and Fiberglas cloth bonded together. The slot wedges are made of a molded product consisting of a laminated Fiberglas cloth and a bonding media. Lead wires are protected with Fiberglas braided sleevings and tied down with Fiberglas tying cord.

Moisture Resistance Problem Solved

The use of Fiberglas as insulation in motors has also helped to solve the problem of moisture absorption. In fact, glass is the first practical totally inorganic textile—one whose characteristics permit it to be used on standard textile machinery. In the laboratory and in operation these characteristics have proved it to be, in most cases, superior in many ways to other fibrous materials used for electrical insulation.

Fiberglas insulation is being specified for a wide variety of jobs, ranging in size from fractional horsepower motors to the largest of generators—such as will be used in the Grand Coulee Dam. These generators are among the largest in the world.

Fiberglas has been assigned to some of the toughest motor insulation jobs industry affords—oil well work with its muck and grime, 24-hour performance in mine ventilation with its moisture, steel mills with their heat and steam, and freight-hauling locomotives with their burden—and has made good.

S S S

A. J. Mrak
Wyoming

As a serviceman, I didn't realize how valuable the magazine was until one day I was servicing a Majestic and happened to have one of the copies which contained all the information I needed.

J. Wiley Bunn
Tennessee

I have been taking your REFRIGERATION SERVICE ENGINEER since September 1938, and I find it is the most interesting and most helpful of any literature I take. For reading and for references I feel like I want the back issues of last year. If possible, I would like to get from January through August, Volume 6 Nos. 1-8.

Orville Root
Indiana

I sure enjoy your helpful magazine. Wouldn't be without it.

The Sparton Compressor

DURING the year 1934 the Sparton refrigerator, manufactured by the Sparks-Withington Company, was equipped with an open type direct drive compressor which differed widely from the equipment used in succeeding years. A conventional belt driven type compressor was used on all models in the following years.

The belt driven models need no explanation to the service engineer since they are essentially the same as other conventional belt driven types. Recent inquiries, however, indicate that some difficulty is experienced in dismantling and repairing the direct driven type, and the following information on its construction may be of help.

The direct expansion dry type of system using an automatic expansion valve was employed in the direct driven machine. During the year, four models of cabinets were produced; however, the same size machine was used in all models and, therefore, the amount of refrigerant (SO_2) was the same for all models. Though the manufacturer's information shows that 25 ounces of refrigerant is required to operate the system, the receiver has a volumetric capacity of 60 cubic inches, which indicates that the system can contain more refrigerant if it is desired to supply it with a holdover supply. The amount of oil contained in all models is 14 ounces.

The evaporator is constructed of one continuous length of ⅜-inch copper tubing wound around the brass shell containing the ice cube trays. This is the typical type of direct expansion coil and provides very simple construction.

The suction line from the evaporator to the compressor is 5/16-inch copper tubing and is insulated with a sponge rubber sleeve to prevent frosting or sweating.

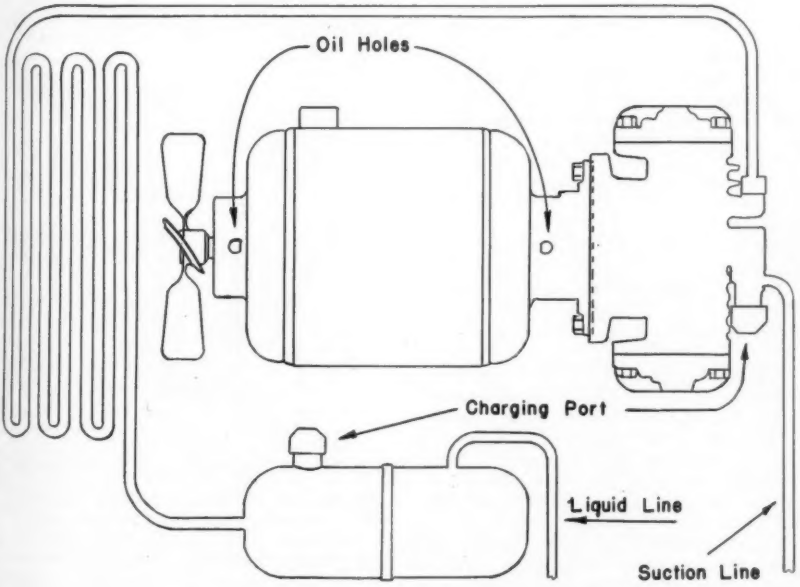


Fig. 1—Schematic view of the Sparton C-2062 unit

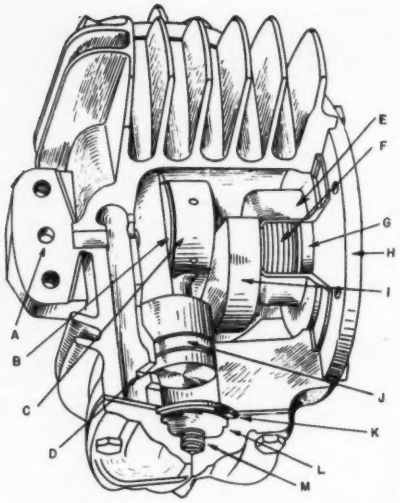


FIG. 2—CUT-AWAY VIEW OF COMPRESSOR

A—Suction inlet	H—Motor Flange
B—Eccentric	I—Counterbalance
C—Connecting rod	J—Piston
D—Suction Port	K—Valve plate
E—Seal housing	L—Valve
F—Seal Bellows	M—Valve Spring
G—Steel seal ring	

The temperature control is the usual type of cold regulator which incorporates such conveniences as the start and stop button, a cold control with a defrosting range, and an overload protection device.

Factory settings of the cold control at position Number 1 is 17 degrees F. cut-off temperature and 30 degrees F. starting temperature.

Motors used are 1/5-hp. and are of the repulsion-induction, brush lifting type. The motor and compressor are solidly connected as shown in Fig. 1 so that in the course of repair the two parts may be removed as one section.

The system is a conventional open type employing the bellows type seal, although no service valves are provided. Two charging ports—one on the high side of the system and one on the low side, as shown in Fig. 1—provide a means for attaching service gauges and for adding refrigerant when needed.

The compressor is of the horizontally opposed twin cylinder reciprocating type and consists primarily of three moving parts, as follows:

(1) Two pistons which are cast in one casting, operating in cylinders directly opposed to each other.

(2) A connecting rod which connects from the eccentric to one of the pistons.

(3) The eccentric and its counter-balance.

The shaft of the motor extends through the seal plate of the compressor into the compressor itself and the eccentric is mounted directly on the motor shaft. Thus the entire assembly is equipped with only one shaft.

The seal plate is an integral part of the motor end-belt.

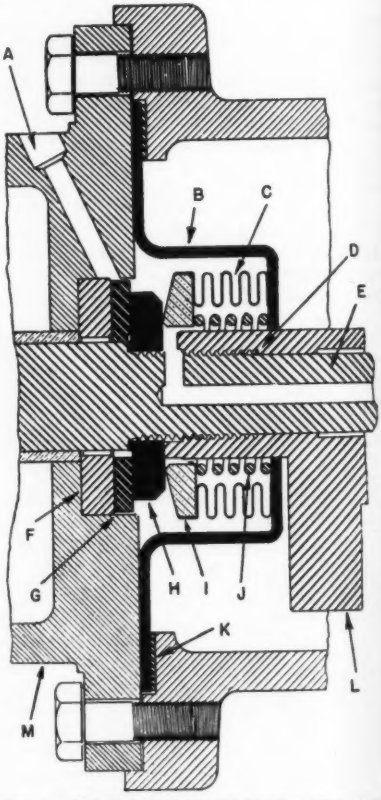


FIG. 3—CROSS-SECTION OF SEAL ASSEMBLY

A—Oil well	G—Fiber thrust ring
B—Seal housing	H—Steel seal ring
C—Bellows	I—Seal nose
D—Eccentric threaded on shaft	J—Seal spring
E—Motor shaft	K—Gasket
F—Steel thrust ring	L—Eccentric
	M—Motor flange

Probably one of the things which most frequently confuse the service engineer not familiar with this machine in dissembling it is the fact that the eccentric and its counter-balance are threaded on to the motor shaft as illustrated in Fig. 3. In most refrigerating machines the eccentric is either keyed to the shaft or is held in place by set screws, and it is often that it is not possible to immediately detect the fact that the eccentric is threaded to the shaft. Rotation of the shaft is usually in a direction opposite to that which will unscrew the eccentric from the shaft.

To dissemble the compressor the bolts around the motor flange are removed, which permits the entire compressor body to be separated from the motor. In doing this the motor and compressor should be stood on end with the motor uppermost so that the oil from the compressor body will not run out as the two are separated.

The complete seal assembly together with the eccentric and counter-balance will be removed with the motor, leaving only the pistons and connecting rod in the compressor body.

The eccentric may be removed from the motor shaft by lightly tapping the counter-balance with a hammer so that it will turn in the opposite direction to which the motor rotates. After the eccentric is removed, all parts of the seal assembly are easily removable.

The pistons of the compressor are cast from aluminum alloy which provides a light weight construction. Piston rings are not used, but the action of the pistons is extremely smooth due to precision grinding, fitting and alignment. The bore of the compressor is 1 1/16-inch, with a stroke of 11/16-inch. It has a displacement of 2,133 cubic inches per minute.

No suction valves are used, but a suction inlet port in the side of each cylinder provides a control inlet for the gas. Discharge valves are of the spring-loaded disk type.

Oiling for the compressor is provided through the splash system which thoroughly lubricates the connecting rod, pistons and wrist pin. An oil cup on the outside of the compressor is provided so that lubrication may reach the outer surfaces of the seal. Lubrication to the inner side of the seal is provided for by a hole drilled through the center of the shaft, which receives its supply from the crankcase of the compressor.

A Simple Calorimeter

WHEN dealing with used machines, trade-ins, etc., the service shop is occasionally confronted with the problem of determining what the capacity of the machine is after it is rebuilt. Then, too, such things as missing name plates on which the capacity is shown, changes in motor size, compressor speed, etc., will make the capacity of the machine doubtful.

Calculating the output by the usual method of determining the cubic foot displacement of the compressor per minute and converting that to work done in B.t.u. per hour involves rather long and tedious calculations and the final results are doubtful because they are purely theoretical and do not take into consideration all the small factors governing the overall efficiency of the unit. Furthermore, they can not properly compensate for the changing conditions found in actual operation.

A calorimeter test has always been recognized as the best method of testing compressing units and of determining their true output under actual working conditions. Several loading methods with a variety of different design calorimeters have been used. Of these, the most accurate and easy to use portable type for small commercial units was described in the September issue of this journal, but due to the cost of such construction it is possible that many service organizations would prefer a less convenient and less accurate method if the cost could be reduced to within their means.

The calorimeter described in the following can be constructed with comparatively little expense and its accuracy, after a little prac-

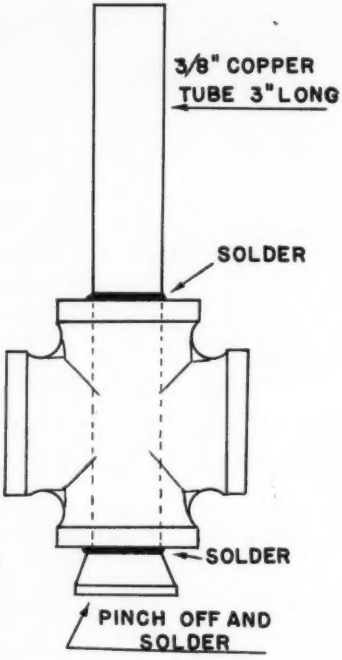


Fig. 1—Details of the thermometer wells used in the calorimeter

tice in its use, will be found to be sufficient to meet the needs of the average service shop.

Equipment Required

1 Water Cooled Counterflow Condenser about 1-hp. size.
3 Pencil-type Thermometers.
3 ¼" Brass Pipe Crosses.
1 Automatic Expansion Valve.
1 Globe Water Valve, Hand Operated.
1 Compound Gauge, 30" to 60 lb.
1 Pressure Gauge, 0 to 200 lbs.
1 Wooden Box, Size to Be Governed by Dimensions of Condenser
Sufficient Insulation to Fill Box.
1 Standard One-Gallon Measure.

The three brass pipe crosses listed in the material list are to be used for the construction of the thermometer wells as illustrated in Fig. 1. A four-inch length of ⅜-inch copper tubing pinched off at one end and soldered is inserted through a ¼-inch brass pipe cross. The tubing is then soldered permanently in place at each end of the tee. When placed in use the ⅜-inch tube is filled with water and the thermometer inserted in it.

The water cooled condenser should be connected so the water passes through the inner tube while refrigerant passes through the outer tube. A wooden box should be constructed large enough so that the condenser and expansion valve can be contained in it with sufficient room for at least three inches of insulation all around it. The insulation used may be ground cork, mineral wool, balsam wool or any other insulation of equivalent insulating value.

Referring to Fig. 2, the expansion valve (V_2) should be connected as closely as possible to the side outlet at the top of the water cooled condenser. It should be so arranged that when the insulation is packed around the coil in the box the removal of a small portion will expose the adjustment screw of the valve for regulation. The side outlet of the lower end of the coil is connected to the suction line leading to the compressing unit under test.

The inner tube at the lower end of the condenser or calorimeter is connected through the thermometer well (T_2) and the hand wheel globe valve (V_1) to the city water supply. The thermometer well (T_2) should be as close as possible to the outside of the box so that no heat will be picked up from the surrounding air between the thermometer and the entrance to the calorimeter.

The center tube at the top of the calorimeter is connected through the thermometer well (T_1) which is also mounted close to the box. To the other side of the thermometer well, a short piece of pipe and a rubber hose is connected which may be easily transferred from a drain to a gallon measure during the test.

The thermometer well (T_3) is connected in the suction line about two feet from the suction side of the compressor under test. Compound and high pressure gauges should be installed on the unit under test and all connections made tight and completed as in Fig. 2.

Making the Test

After all connections are completed and tested for leaks fill the thermometer wells with water, insert the thermometers in them and wrap the wells with hair felt. Be sure that all refrigerant lines are dehydrated and all air is evacuated from the system. Charge

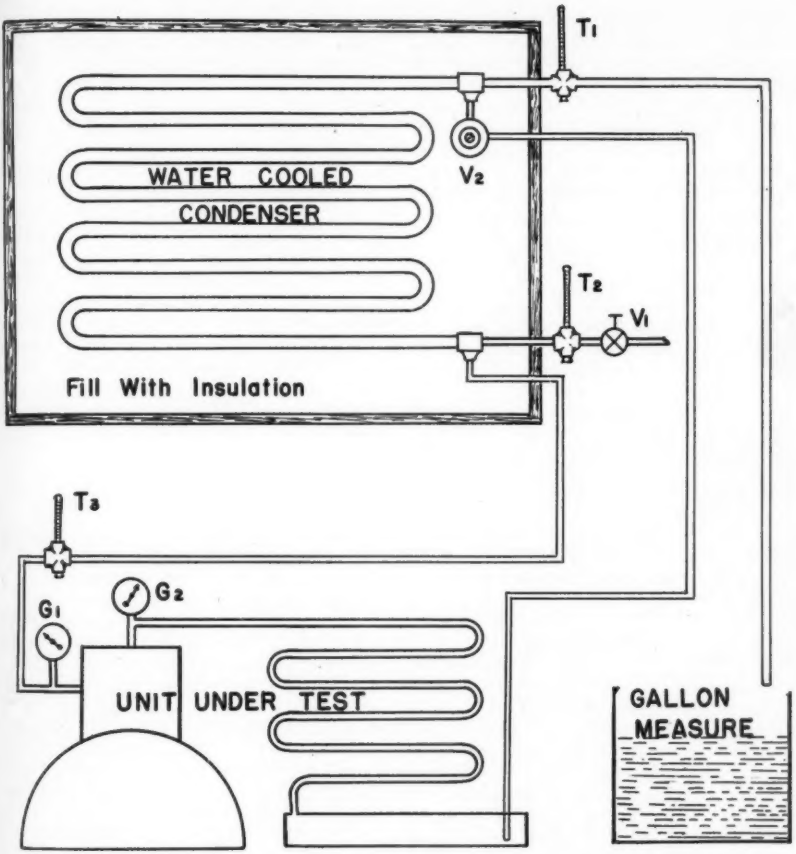


Fig. 2—A schematic diagram showing all connections between the calorimeter and the unit to be tested

the system with sufficient refrigerant to operate it with normal pressure.

Open all valves and start the motor. The expansion valve should be adjusted for the same average back pressure that the machine will operate under when placed in actual service or, in other words, it should be adjusted to produce the same evaporator temperature as when installed. This is important because the B.t.u. capacity of the unit will vary with the increase or decrease of the back pressure.

The water valve (V_1) should be adjusted until a suction line temperature of about 65 degrees F. is obtained at the thermometer (T_3). These two adjustments should be continued until the suction pressure and temperature become stabilized and then the machine should be permitted to run for at least fifteen minutes to be sure that no change takes place before a test run is made. During this time all operating conditions can be noted to determine whether the machine is operating normally. A wattmeter may be used to check the load on the motor and if the temperature of the air going to the condenser is taken the proper head pressure may be determined through the use of a head pressure calculator and compared with the head pressure as shown on your gauge.

After all adjustments have been made and all conditions have become thoroughly sta-

bilized make a note of the temperatures at (T_1) and (T_2), then shift the outlet water hose from the drain to a standard one-gallon measure and with a stop watch determine the exact time required to fill the measure with the water passing through the calorimeter.

The B.t.u. capacity of the unit is then obtained through the following formulae:

$$\text{B.t.u. capacity} = \frac{3600 \times 8.34 \times (T_2 - T_1)}{X}$$

Where: X = Time in seconds required for one gallon of water to pass through the calorimeter.
T_2 = Inlet temperature of water.
T_1 = Outlet temperature of water.

Example of Test

As an example of a test, let us suppose we have a unit charged with methyl chloride which has been connected to the calorimeter and is ready for adjustment and test. Since the unit is going to be used to refrigerate a walk-in cooler equipped with fin coils we will assume the average back pressure will be 14 pounds gauge; therefore, in our test we will set the expansion valve (V_2) so that we obtain a back pressure reading of 14 pounds on the gauge (G_1). We will adjust the water valve (V_1) until we secure a temperature of 65 degrees F. at (T_3).

During the fifteen minutes or more running time before the test is made an occasional check of the temperature at (T_3) and pressure at (G_1) is made to be sure of no variation and at the same time the pressure at (G_2) is checked with what it should be according to the head pressure calculator.

After the stabilization period is over we will make note of the temperature at (T_2) which we will say is 70 degrees F. and the temperature at (T_1) which is 58 degrees F. We then shift our outlet water hose to the one-gallon measure and find according to the stop watch that it required three minutes and fourteen seconds, or 194 seconds, to fill. We will probably run this test two or more times and take the average results so as to eliminate as much error as possible, but for the sake of this example we will assume our readings to be average.

Since it requires 194 seconds to run one gallon of water through the calorimeter, and there are 3600 seconds in an hour, the number of gallons per hour would be $\frac{3600}{194} = 18.5$ and since one gallon of water contains 8.34 B.t.u. per degree change in temperature and our temperature change is 70 — 58 = 12 degrees, the total B.t.u. removed from the water by the machine based on an hourly rate would be:

$$\frac{3600 \times 8.34 \times 12}{194} = 1856 \text{ B.t.u. per hour.}$$

Manufacturers' catalogs usually list the B.t.u. capacity of their machines under different suction temperatures or pressures; therefore, if the calorimeter test has been made as a check on the efficiency of the machine after it has been rebuilt the B.t.u. capacity indicated by the test may be compared to that given by the manufacturer under the same suction pressure. Such a comparison will indicate how well the rebuilding work has been done.

CLEANING SOLUTION

THERE is a new, safer cleaning solution on the market which is intended to take the place of the gasoline used in shops for cleaning parts of grease and dirt.

It is called "mineral spirits" and is obtained from the Standard Oil Company. Flammability of the solution is much lower than gasoline, and the fire department will permit its use in open containers. It is easier on the hands and the cost is about the same as gasoline. Though its rate of evaporation is slower than gasoline, parts can be readily blown dry. The solution is obtainable in 50-gallon drums.

A. G. Blomberg
Connecticut

I am a relatively new reader of your Refrigeration Service Engineer, but have as yet never seen any publication that contains so much useful information for the refrigeration serviceman.

Robert Chandler
Ohio

I received my first copy of The Refrigeration Service Engineer yesterday and I am surely well pleased with it. It is just the magazine I've been wanting.

Do you supply back issues? If you do, I would like to have the January and February copies. Please send the magazines and bill for same and I will send the money by the next mail.

SERVICE KINKS

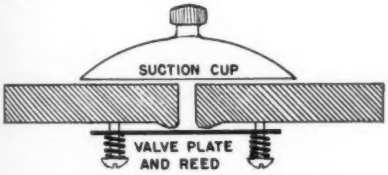
Tools and Equipment You Can Build

Under this heading will appear simplified or short cut methods of performing individual service operations; also details of how you can build special tools and equipment for your own use. Readers are invited to submit information for publication under this head.

Suction Cup Tester for Valves

By E. F. RHODES
Wichita, Kansas

A RUBBER suction cup from an auto top aerial makes a handy instrument for testing the discharge valves in compressors after they have been replaced or repaired or to determine whether the valve leaks.



Suction cup mounted on plate ready for test

The cup is pressed on the under-side of the valve plate and should hold its grip with the valve assembled dry of oil. If it loses its grip slowly or immediately it shows the amount of leak in the valve.

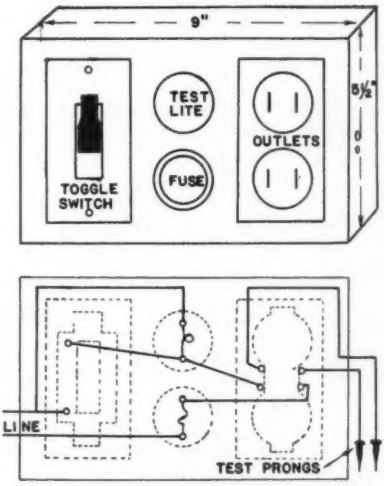
Very often a valve may be improperly seated or have foreign matter under it. The leak can be quickly detected in this manner with little lost time. The suction cup may be purchased at most radio shops for 15 or 20 cents.

Electric Test Block

By GEO. DEICHMANN
New Orleans, La.

HERE is a small portable test block which may be used on the bench in your shop or in the field. It is particularly useful when working on domestic units in the field.

Pull the refrigerator plug out of the wall receptacle and plug it into the receptacle on the test block. Plug the line cord of the test block into the wall receptacle, make sure that the test block switch is on the off-position, then touch the two test prongs together to see that you have current through the test block.



Two views of the test block showing the face of the block in the upper view and the wiring connections below

The wiring of this block is such that the switch must always be in the off-position when the two prongs are touched together because if it is not, a direct short will occur in the test block and the fuse will be blown.

With the refrigerator plugged into the test block the switch may be used to turn the refrigerator on and off while you are working on it. With the switch in the on-position the test prongs and indicator light may be used to test for shorts or opens in the electrical system of the refrigerator.

Bunsen Burner to Heat Evaporators

By O. J. TINZMANN
Chicago, Ill.

ABOUT ten feet of rubber hose and a Bunsen burner provide a handy method

of applying heat to evaporators, expansion valves, etc., when pumping down the machine prior to repairing. A Bunsen burner provides a clean, quick heat with no danger of smoke and odor to contaminate the cabinet and kitchen.

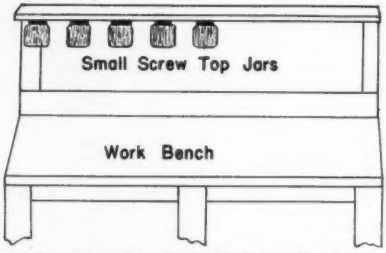
To connect the Bunsen burner, remove one of the burners from the kitchen stove and slip the rubber tube over the valve nozzle. Your rubber purging hose may be used for this purpose and a Bunsen burner can be purchased from a laboratory supply store.

Household evaporators can be pumped down in 20 or 30 minutes with heat applied and the outer surface will be dried so that no moisture will enter the system while changing floats, etc. Open flames should not be used on alcohol brine tanks nor on Isobutane systems.

Small Parts Holders

By G. C. CONNELL
Hemet, Calif.

A CONVENIENT manner of storing those small parts needed around the work bench so often is illustrated in Fig. 1. The bench is provided with a narrow shelf and the lids of a number of small screw top



Jars fastened to the bench for small parts

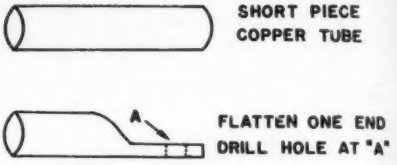
jars are fastened to the under-side of it with wood screws. Small parts may be kept in the jars, which can be screwed up into the lids.

The top of the shelf is left free for the arrangement of tools or other larger objects.

Electric Motor Lug

By JACK JOSEPHSON
Bridgeport, Conn.

PERHAPS you do not stock a variety of different size motor lugs, yet occasionally may have need of one. They are inexpensive to buy, but often cost more than they are worth to go and get one.



Copper tubing for motor lugs

Fig. 1 illustrates a quick manner of making a lug from copper tubing. Any size tubing may be used depending on the size lug you need.

Protecting the Compressor from Frost-Back

By O. J. TINZMANN
Chicago, Ill.

AFTER overhauling a multiple system there is often danger of a frost-back between the time the system is placed in service and a call back is made to make final adjustments.

Clamping the feeler bulb of an ordinary household cold control to the suction line near the compressor and connecting the control in series with the other controls will cause the machine to cycle on and off when the frost-back reaches the control.

The control may be connected permanently or temporarily until a call back can be made. It will protect the compressor from damage due to a lack of oil which has been pumped out with the liquid refrigerant reaching the crankcase.

How to Distinguish Between Methyl and Freon (F-12)

WHEN the name plate of a machine does not indicate the refrigerant used it is often difficult to determine by gauge readings and odor whether the refrigerant is methyl chloride or Freon (F-12).

The following two tests, however, will aid in determining the kind of gas used.

First—Draw off a sample of the liquid refrigerant from the receiver in a test tube or any open container. Submerge the bulb of your pocket thermometer in the liquid and note the temperature. If the temperature is between —11° and —9° F. the refrigerant is methyl chloride. If the temper-

ature is between —28° and —21° F. the refrigerant is Freon (F-12). These temperatures given are the approximate boiling temperatures of the two gases at atmospheric pressure. A slight variation may occur due to the oil in the refrigerant.

Second—Freon will not burn under any conditions but methyl chloride will when the proper mixture of air and methyl is obtained. When a machine is completely discharged or it is not possible to get a sample of liquid from it try the following:

Close both compressor valves so the compressor is isolated from the rest of the system. Open the service port of the discharge valve and start the motor allowing a vacuum to be drawn on the compressor crankcase. There is nearly always enough refrigerant contained in the oil of the compressor so that some vapor will be drawn off under a vacuum. Apply a match or any open flame to the discharge port and if the gas has a tendency to burn with a weak floating flame the gas is methyl chloride. If the gas will not show any indications of igniting, it is Freon (F-12).

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment as well as oil burners to "The Question Box."

COMMENTS ON QUESTION 330

IN the Question Box of the September issue in Question 330 a subscriber asked you about repairing a brine tank that leaked into one hole. I have had experiences of this sort in my work and thought perhaps I could make a suggestion.

Take the measurements of the hole that leaked and go to a sheet metal shop and

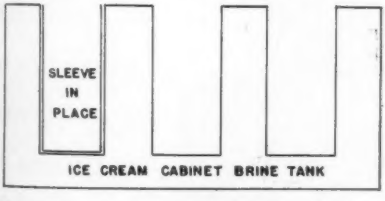


Fig. 1—Showing cross-sectional view of repair sleeve in place

have a sleeve made of a piece of galvanized metal so that the brine will not attack it too much. Make the sleeve so it will just fit inside the hole in the fountain or cabinet. If the brine leak is slow enough you can dip the brine out of the hole and pour it back into the charging port of the brine tank. If it leaks too fast you will have to drain all the brine. See Figure 1.

EXPANSION VALVE OVERSIZE

QUESTION 334: On a beer precooler job handled by a new Peerless 63 unit cooler with a Peerless VM4 thermal expansion valve hooked to a Curtis condensing unit, model MAR-75-R, charged with CH_3Cl, raw liquid passes intermittently to the compressor causing it to slug oil. Are any of the following causes for this condition: Suction line only 15 feet in length; improper balance between coil and condensing unit; improper operation of expansion valve; oil traps in suction line.

What would be the best way to remedy this condition? It is also necessary to have the low side pressure control cut-out at 8 lbs. in order to maintain a 35° F. temperature in the cooler.

ANSWER: While you haven't given me any information as to the B.t.u. load of the space you are cooling, I am of the opinion that your trouble is due to an improper balance between the coil and condensing unit, or which is probably more likely, the unit cooler is too large for the space it is cooling.

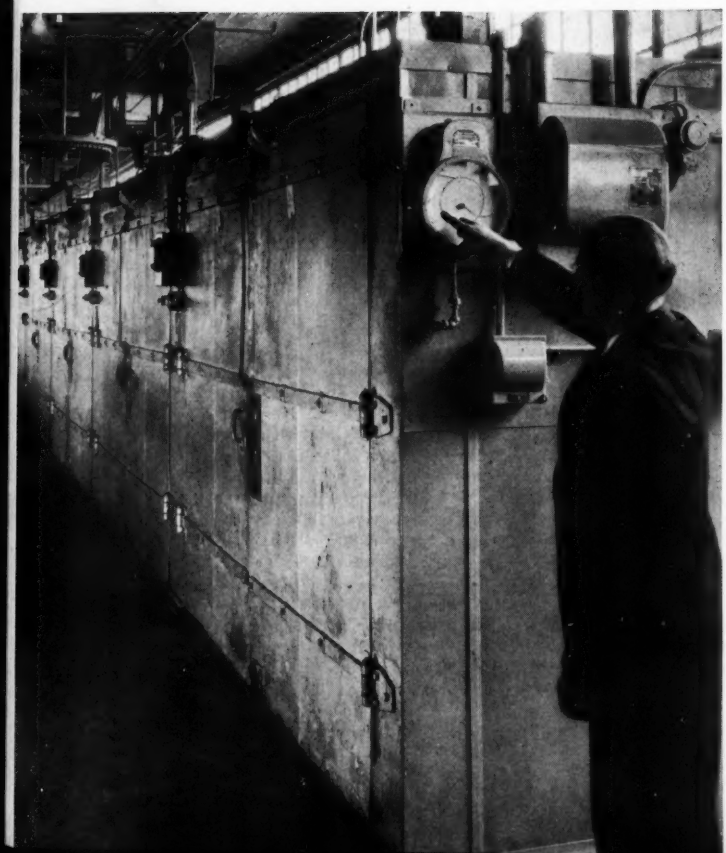
I say this because the VM4 thermostatic expansion valve is that which is recommended for use with the No. 63 unit cooler, but the trouble you are experiencing with raw liquid returning intermittently to the compressor indicates that the expansion

Yes, Mr. Refrigeration Engi

ABSOLUTE

of Evaporators, Coi Val

is Just One of Mar



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Installation and service engineers are finding by actual experience that one of the important hidden values of Fedders low-sides is ABSOLUTE DEHYDRATION.

Moisture is not only the enemy of the refrigeration system, but the enemy of reputations as well.

Your customers are more likely to blame you than the equipment. Always play safe by using Fedders low-side Units . . . they have been thoroughly cleaned and absolutely dehydrated. Moisture content is kept at less than .00005 lb.

EDDERS MANUFACTURING COMPANY, INC.

BUFFALO, N.Y.

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valve is too large, or that the orifice in it is too large.

A cut-out pressure of 8 lbs. should be correct for the 35 degree temperature in the cooler, which should provide the desired results.

I believe the best way to overcome your trouble now is to exchange the expansion valve for a size smaller, or in other words, to replace it with a VM3.

I take it for granted the rest of the job is working satisfactorily and you are merely concerned with overcoming the cause of raw liquid reaching the compressor.

MILK COOLING

QUESTION 335: I have a customer who has the following commercial unit and installation job: Model FA275 Frigidaire, ¾-hp., air cooled with an Esco cabinet with a storage of eight cases of quart bottles of milk on each end with a 145 gallon brine tank in the center. There are 25 ft. of ½ inch O. D. copper tubing between the unit and cabinet in the suction line; same amount of ¼ inch liquid line with an automatic expansion valve. This has F-12 gas.

This customer is now installing a pasteurizer and he wants to use this brine for cooling at most 200 quarts of milk down to 45° by means of an Airador. This milk will be cooled to 120° by means of water first.

I know the unit is not large enough to handle this job first class, but he wants to use it for at least a year.

Would you install a thermostatic expansion valve? Would you put a 1-hp. motor on and enlarge the motor pulley? What temperature would you run brine? What would you suggest to handle this job for at least a year?

ANSWER: I assume that you are going to use a double section aerator where the top section is used for the circulation of water and the lower section is used for circulation of brine. I don't know what your reason is for considering that the milk will be cooled to a temperature of 120 degrees by means of water, but from general experience, the milk is usually cooled to a much lower temperature in this section.

This point is very desirable because it leaves considerably less work to be done by the refrigerating machine. Where water is available at 60 degrees Fahrenheit, you should be able to cool the milk to approximately 65 degrees through this means. In order to do this, it would be necessary to circulate approximately three gallons of water to every gallon of milk cooled. It requires about 7.9 B.t.u. to cool one gallon of milk one degree Fahrenheit. If we assume that you can cool the milk with water, to 80 degrees, which I believe is a fair average, the amount of cooling necessary by the refrigeration system will be about 35 degrees Fahrenheit. Two hundred quarts or fifty gallons of milk will contain about 13,825 B.t.u. On the other hand, if for some reason, the milk cannot be cooled lower than 120 degrees with water, then it will contain approximately 29,600 B.t.u.

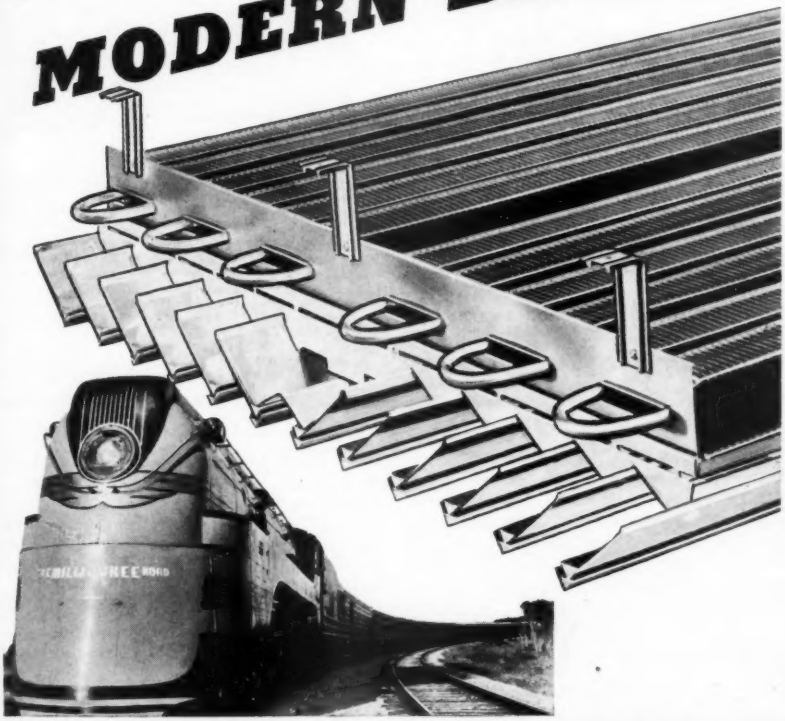
From these figures you can see the importance of cooling as far as possible with the water. Assuming that you can operate your system so that the brine will be brought down to a temperature of 10 degrees and then allowed to warm up to 40 degrees during the aerating period, 145 gallons of brine will absorb about 30,450 B.t.u.'s.

Since you will only require about 14,000 B.t.u. in cooling milk from 80 degrees to 45 degrees, this brine will not be required to warm up to such a high temperature. On this basis, I believe that you could get along quite satisfactorily with the machine you have at present, providing it is not overloaded through the present load conditions. To recover the loss of temperature of the brine through aerating, the machine would have to run about three hours if the milk is cooled to 80 degrees by water. On the other hand, if the milk is cooled to 120 degrees by water, the machine would have to run approximately six hours additional per day over its present operating period.

How to Increase Capacity

It would be very advisable to put a thermostatic expansion valve on the system, and also to increase the motor size to one horsepower and enlarge the motor pulley. The thermostat expansion valve will increase the efficiency of the machine and give you a much better operating condition. The one horsepower motor and enlarged pulley will, of course, increase the output of the unit. If it is not possible to operate the system on a brine temperature as low as 10 degrees, there is a possibility that you can arrange to lower this temperature just prior to the time that the aerating is to be done so that you will have that added storage of capacity to carry you over the aerating period. Or, if you run into difficulty in getting sufficient capacity, an additional brine tank would help considerably in which capacity could be stored during the remainder of the day.

FAST COOLING MODERN DESIGN



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***for* Hermetic Sealed Units**

Over 20 popular makes of hermetic sealed units can be purged or charged with this compact, inexpensive Kerotest Master Valve Set, thus eliminating the need for a separate valve for each hermetic unit. It consists of a simple master valve with adapters and stem extensions to fit all popular hermetic units, all neatly packed in a heavy gauge steel box to facilitate carrying.

The valve is designed with a gauge connection, independent of the service connection—an exclusive Kerotest feature that makes it possible to determine the pressure in the unit at any time during charging or purging without breaking the service connection.

Included in this time and money saving Kerotest Valve Set is a Bristol Wrench which may be used to loosen valves on machines requiring Spline Wrench. Chart in box shows which adapter to use for any hermetic unit. Ask your local Kerotest jobber, listed at the right, about it.

KEROTEST MANUFACTURING COMPANY, Pittsburgh, Pa.

You have not given me any idea of what your present load conditions are, or what the B.t.u. loss through the cabinet might be, therefore, I have no way of determining your total heat load at present. However, I believe the above general discussion might help you somewhat in anticipating the conditions you will meet.

STORING OF HORSE MEAT

QUESTION 336: About three months ago I installed a small Frigidaire condensing unit (model F1C) and a Frigidaire unit cooler using F12 as the refrigerant. This equipment was installed for the Frigidaire dealer in my territory, having been purchased by the owner of a small mink farm who feeds horse meat to the mink. The purchaser stated that he did not wish to freeze the horse meat and that is why the fan type cooler was installed.

Under ordinary conditions, most any meat would keep in this refrigerator at the temperature I am holding (34° F.) without any mold forming, but that is where the trouble is. There seems to be a light colored mold which forms all over the meat after it has been in the refrigerator for a few days, and which has to be cut off. Naturally the owner doesn't like this, and seems to think the equipment he purchased is at fault.

We tried higher temperatures, with no success, so I adjusted the control to drop the temperature, and try to dry out the air in the refrigerator, and the owner placed a box of lime inside thinking that there was too much moisture in the air and that he could eliminate some of it, and stop the mold from forming. So far we have had no success with this procedure.

The dealer who sold this equipment wrote to the Frigidaire factory branch at Oakland, Calif. about it and their engineer advised closing off the expansion valve about a half or three-quarters of a turn and setting the control so as to drop the temperature down as low as possible and still maintain a defrosting cycle which I did, but this did not prevent the mold.

ANSWER: As a usual thing, most of these types of installations provide for the freezing of the meat first and then storing it in the frozen state. I'm quite sure that horse meat is considerably harder to store in the manner in which you are doing than any other type of meat. I took the matter up with a man in our section of the country

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who has had considerable experience with fox farms and mink farms, and his opinion on the matter is that possibly you are not removing the animal heat from the meat before it is placed in the refrigerator. According to the information he gives me, the meat should be allowed to hang in a cool place outside the refrigerator for a period of from four to five hours. Also, the temperature in the box should be kept somewhat lower.

Poor Circulation

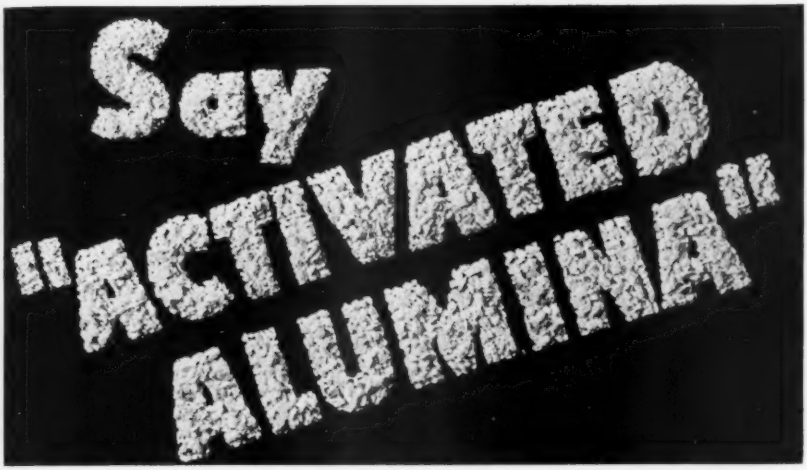
He suggests that a cut-out temperature of 31 degrees and a cut-in temperature of 33 degrees should be maintained. These temperatures given are actual box temperatures, and not refrigerant temperatures. He also makes the further suggestion that the meat may be turning sour, and this would be due primarily to the original condition of it rather than to any condition in the refrigerating system. In the usual type of meat storage installations, this condition is due to poor circulation in the refrigerator, or in other words, insufficient air circulation over the products stored.

It is hardly possible, however, that this is the case in your installation, since you are using a forced convection type of cooler. There is only one possibility along this line, and that is: if the meat is stored in such a way that air cannot circulate freely around it; you may have certain sections which do not receive sufficient circulation. Where this condition exists, it is usually preceded by a sliminess on the meat, or, in other words, a certain amount of sweating. This last suggestion is rather remote and I don't think it will apply to your case.

CAPILLARY TUBES

QUESTION 337: Are capillary tubes used in domestic refrigerators without an expansion valve and, if so, are they satisfactory or are they used to cheapen manufacturing costs?

ANSWER: Capillary tubes are used to do the same job in a general way that expansion valves, low side floats and high side floats do in their own particular manner. It is not necessary to use any of these other controls in conjunction with the capillary tube. The capillary tube is merely a very



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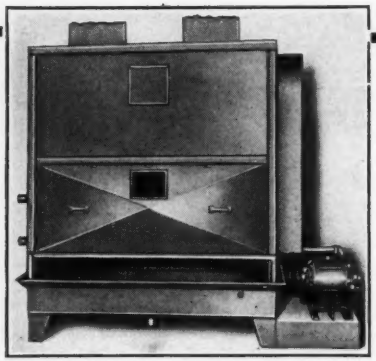

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small size tubing of from 10 to 40 foot lengths which creates enough restriction to the flow of the refrigerant so that a pressure difference between the low and high side of the system is created.

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They are naturally less expensive than any of the other types of liquid controls, but one has to use considerably more care in their installation and operation than on any of the other controls because small amounts of moisture or small particles of dirt in the system will quickly clog them. For this reason a filter is always installed just ahead of the capillary tube.

STICKY COMPRESSOR

QUESTION 338: I have a problem with a Frigidaire FAAS-120 on which I would like a little help. It is a pressure controlled job with Freon refrigerant charge. I get a head pressure of 90 pounds or a little more, but have been unable to get a low side reading because even with the service valve back-seated there is gas and oil leakage when the service connection is uncapped.

This machine was shut down all of last winter but was performing erratically before the shut-down. Upon putting it into operation again it made about 15 cycles all right and then it began to have difficulty in starting as if there was too much head pressure. By turning the fly-wheel by hand past the "tight spot" the machine will start a little slowly, but satisfactorily. Cycles and refrigeration are normal, so it does not appear to be a restriction in the float valve.

I thought at first it was gas bound, but on pumping down to correct that I get no better results. I think that the suction service valve is faulty because of the leakage when it is back-seated, but do not see how that would

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cause the compressor to seemingly bind as it does; therefore, I suspect that my main trouble is elsewhere. If you can give me any help in correcting the trouble I shall be very grateful.

ANSWER: The description of the trouble you are having with the Frigidaire 120 unit leads me to believe it is due to carbon formation or to a gummy sludge, or possibly to copper plating of the parts. The trouble might also be due to piston rings binding in their grooves because of the dirt contained in the compressor. In any case, the only remedy I can see is a thorough cleaning of the compressor and the removal of any carbon or copper deposits on the parts. A third cause of the trouble might be due to a low ambient temperature which permits refrigerant to condense in the oil and the oil has been pumped out of the compressor with the gas, leaving it with insufficient lubrication.

There is a slight possibility, of course, that the motor is the cause of your trouble. If the bearings are tight, or if the starting contacts are dirty, it may have the characteristic of starting under difficulties. This last suggestion, however, is probably very remote, and I really believe the trouble lies in the compressor.

BEER COOLING

QUESTION 339: Enclosed is a crude diagram of an installation I am to make. It is a bar with a self-contained precooler 12½ ft. long, 8½ ft. high and 2½ ft. deep and is lined with two inches of cork. It is equipped with a 4-tube finned evaporator coil 56 inches long and made of one-half inch tubing. The temperature of the cooler is to be kept at 45° F. and the room temperature would be 90° F. at the warmest time of the year.

At each end of the precooler there is a sweet water bath (non-circulating) that will contain piping for two beer taps in each. The size of these baths is 29 inches long, 10 inches high and 8 inches deep. The temperature of the water in these baths is to be kept at about 36° F.

The condenser is a ½-hp. Merchants & Evans air cooled unit. It is to operate 16 hours per day.

1—How much ½-inch tubing should be used in each sweet water bath and how is this figured? Water is to be kept at 36° F.

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What would you allow for cooling coils and beer pipe displacement?

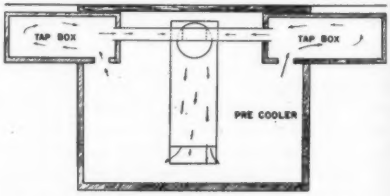
2—How is the complete load per hour of the precooler and sweet water baths figured, and would the ½-hp. unit be adequate for operation 16 hours per day?

3—Would you install the thermostatic expansion valves as shown in the diagram or would you install a valve in each sweet water bath and one on precooler coil; or would you have one valve take care of the sweet water baths (in which case feeler bulb would need long capillary tube) and one for precooler coil?

ANSWER: If the sketch of your beer cooling installation is correct in detail, then, in my opinion, you have an ideal situation for installing one of the more recent methods of beer cooling.

The method I am going to describe is one which is used considerably by one of the large brewing companies where the precooler is installed below the tap-box either on the same floor or in the basement.

It is assumed that the beer when delivered is within five degrees or so of the desired temperature and therefore, does not need very much precooling before serving. If this is not the case, the beer must be ordered at least twenty-four hours in advance of serving to allow time for precooling. The precooler is kept at whatever temperature it is desired to maintain the beer. In other words, if it is desirable to serve the beer at a temperature of 45° F., the precooler is maintained at 45° or slightly less.



Suggested method of cooling this type of Beer cooler.

With this arrangement, the coil boxes have no product load and are required to do no work other than absorb heat loss through the walls of the boxes and to maintain the temperature of 45° around the beer lines. This can be done very economically and efficiently by the circulation of air through the tap boxes from the precooler. If you have

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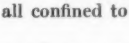
not already secured the large fin coil for the precooler, I would suggest using one of the new type convection coolers and install ducts as shown in Fig. 1. Two air duct openings would have to be cut in each coil box or, if it would be easier, the entire end could be removed making one large opening instead of two small ones as shown.

The forced convection cooler can be mounted on the wall at the back of the cooler, and the ducts placed in front with the funnel-shaped junction as shown in Fig. 1. So that a part of the air circulation will be directed into the ducts, circulation of the air would be as indicated by the arrows.

If you have already secured the large fin coil for the precooler, the duct can be arranged as follows: Mount the coil as high in the cooler as possible and place the ducts with the funnel junction directly below and provide it with a small fan operated in parallel to the refrigeration motor. Only one coil and expansion valve are needed in this type of installation, and a one-half horsepower machine will handle it very easily. It is not necessary to have any beer coils since all cooling is done in the precooler. The beer lines are connected directly from the kegs to the taps. This is an advantage to the owner because the short beer lines are much easier to clean than beer coils. Also, beer temperatures can be maintained at a more uniform temperature regardless of how fast the beer is drawn. The beer lines are all confined to refrigerated areas.

This method of cooling has not been very widely publicized because it is adaptable only to certain conditions. However, you have the ideal condition in which to use it and I believe it is the cheapest way, and possibly the most satisfactory method of cooling beer in this case.



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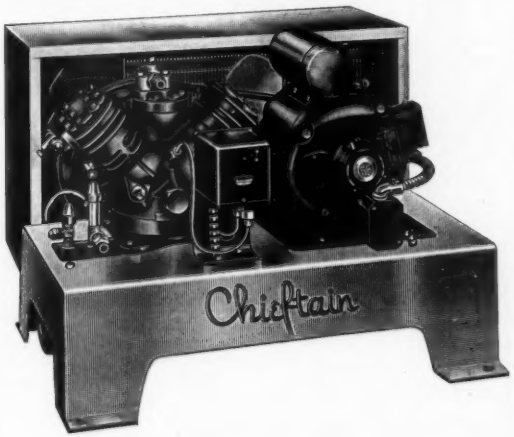

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TWIN CITIES CHAPTER, MINNESOTA: Meets 2nd Tuesday at Midway Y. M. C. A. President, Wm. Warner; Secretary, W. E. Gleb, P. O. Box 3332, St. Paul, Minn.

VULCAN CHAPTER, BIRMINGHAM, ALA.: President, Sandy Nelson; Secretary, E. D. Gothberg, R. 2, Box 225A, Birmingham, Ala.

WESTERN MASSACHUSETTS CHAPTER, SPRINGFIELD, MASS.: Meets 2nd and 4th Wednesdays. President, F. J. Kasper; Secretary, H. C. Lambert, 31 Elm St., Springfield, Mass.

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WINNIPEG CHAPTER, WINNIPEG, MAN., CAN.: President, J. B. Shepherd, 494 Clifton St., Winnipeg, Man., Can.

WORCESTER CHAPTER, WORCESTER, MASS.: President, F. E. Vachon; Secretary, S. B. Garland, 32 Neptune Road, Worcester, Mass.

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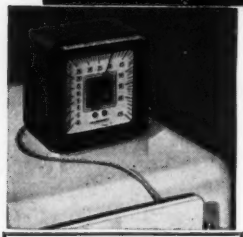

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When not in use the bulb and capillary tubing are neatly concealed in the case to form a sturdy compact unit which withstands rough handling and takes up little space in the kit. Note the heavy rubber buffer, completely encircling the case, which prevents damage of any surface on which it is placed and also protects the instrument.

Use the Serviceman for answering all complaints of too high or too low temperature—testing switch action—checking brine tanks and vessels—in fact, all household or commercial servicing. And do not overlook its value in selling refrigerators.

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It's Chicago—in January

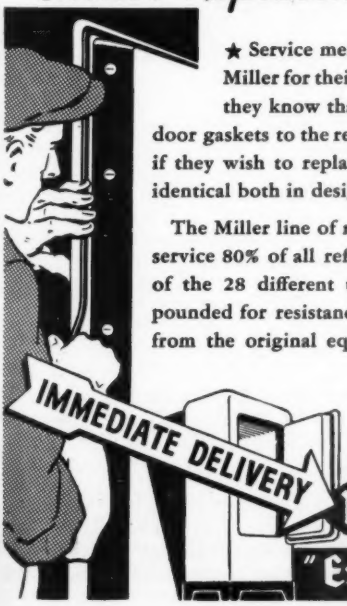
REGARDLESS of how you make it, the important thing is to plan now to be present when the sixth annual convention of the Refrigeration Service Engineers Society is called to order on January 15th at the Stevens Hotel in Chicago. All roads will beckon you to come to the most important convention of service engineers yet held. It will be an important event—important to the interests of your own business.

Profitable Convention

The convention is specifically planned to provide in a practical way such information as you can use in your every day servicing and installation work. It will bring first hand information of what future trends indicate in the refrigeration field. If you have attended former conventions of the society, you can well appreciate the valuable information which is brought out in the educational discussions.

It has been truthfully said that the educational programs of the R.S.E.S. represent an intensive post graduate course in "what has happened" during the past year and what the outlook may be for the coming year. From every source will come new ideas.

SELL THE "ORIGINAL EQUIPMENT" LINE OF *Miller Replacement Door Gaskets*



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The Miller line of replacement door gaskets enables you to service 80% of all refrigerators regardless of make. Every one of the 28 different types is made of rubber specially compounded for resistance to grease, aging, and wear, and produced from the original equipment dies.

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E. A. Plesskott, St. Louis, who has been appointed chairman of the general convention committee.

Large Interesting Exhibit

The entire program is planned to take advantage of every moment of the four-day convention. The Refrigeration Service Engineers Society meetings will be held from 10:00 a.m. till 1:00 p.m. Monday, Tuesday, and Wednesday, with an entire day free on Thursday for final inspection of the many exhibits. Each afternoon will also be open to provide time for the visit to the exhibits, as well as to manufacturing plants located in Chicago. Housed in the large Exhibition Hall will be approximately 150 exhibits of the leading refrigeration equipment manufacturers. Much of the equipment shown will be on exhibit for the first time, and this convention will serve as its introduction to the industry for the coming year.

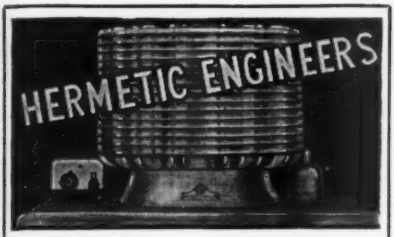
The manufacturers exhibit is under the sponsorship of the Refrigeration Equipment Manufacturers Association.

Entertainment

As in the past, the evenings will provide time for relaxation, and the events planned will appeal to all. Tuesday evening is set aside for the large All-Industry Banquet, in which all associations meeting during this time will be invited to participate.

Bring the Ladies

Each year, more and more ladies are making the convention of the Refrigeration Service Engineers Society their convention time. Plans will be made, as in the past, for



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Many of these service men, with years of practical experience, have enrolled for U. E. I. training . . . and they have learned some new tricks too.

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their program of entertainment during the convention.

By All Means—Come

Put Chicago in January on your "must" list. Come and fraternize with service engineers from every section of the country.

Enter into the discussions on problems that interest you. Return to your work enthused and encouraged to make 1940 a banner year. Many innovations are being planned to make this convention the outstanding success it promises to be. Every service engineer may consider this as *his* convention. Let's go to Chicago—plan to spend the entire week. You'll find it a profitable investment.

CONVENTION COMMITTEE ANNOUNCED

ANNOUNCING the General Convention Committee, planning the many events for the sixth annual convention, President Claude Brunton states, "It is my desire that this committee be truly representative of our entire national organization. I have appointed the committee members who reside in close proximity to Chicago, so that the necessary details attendant to our sixth annual meeting may be handled with dispatch. I do want every member in every chapter to consider that he, too, is a member of the committee, which is planning for the largest attendance the Refrigeration Service Engineers Society has ever had, and to arrange for the many details of the educational features of the convention. We all want to feel that this convention is not just the plans of one chapter, or one state organization, but in the broadest sense, an 'All-Society Convention,' planned and executed for the benefit of each individual member.

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"I again cordially extend the invitation of our National Society to every service engineer, who is not a member, to come and meet with us, and to participate wholeheartedly in all of our events."

General Convention Committee
E. A. Plesskott, St. Louis, Chairman

Committee members: Vern Nold, Marion, Indiana; J. Barksdale, Chicago, Ill.; Ray R. Moss, Oshkosh, Wisconsin; A. D. McGill, Peoria, Illinois; F. Klepfer, Indianapolis, Indiana; P. F. Noth, Madison, Wisconsin; J. A. Pechi, South Bend, Indiana; Leonard C. Nelson, Galesburg, Illinois; R. C. McCarthy, Rockford, Illinois; Eugene H. White, Calumet City, Illinois; A. L. Hammond, Springfield, Illinois; William Metcalf, Joliet, Illinois.

ILLINOIS STATE ASSOCIATION TO MEET NOVEMBER 4-5

ROCKFORD Chapter of the Refrigeration Service Engineers Society will act as hosts to the state chapters of Illinois at the second annual meeting of the Association, to be held in Rockford, Illinois at the Hotel Nelson, Saturday and Sunday, November 4 and 5. Come early is the invitation, and if convenient, come on Friday evening for the preliminary activities.

The convention will be formally opened on Saturday, November 4, at 10:30 a.m. The educational program will start at 1:00 p.m. the same afternoon, with the principal educational feature under the direction of George H. Clark of Detroit, Chairman of the National Educational Committee.

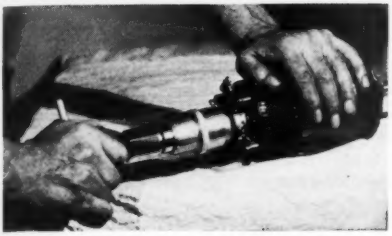
Saturday evening, the annual dinner dance will be held in the ballroom of the Hotel Nelson at 7:30.

On Sunday, the educational program will start at 9:30 a.m. with several interesting features planned.

This two-day conference will provide an interesting session for all refrigeration service engineers, and invitations are being extended to all members of the society and non-members residing in neighboring states to meet with the Illinois State Association.

The committees in charge of arrangements and program comprise the following: *General Convention Committee,* all presidents of

A "PET" of a Tool for Hard-to-remove OIL RINGS



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Simple in its operation and no Norge bushing or oil thrower ring is too obstinate for this handy tool.

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Illinois chapters; *Educational Program,* Willis Stafford, Aurora, *chairman;* R. C. McCarthy, Rockford; A. D. McGill, Peoria; R. M. Potter, Springfield; E. J. Seaton, Rockford; *Entertainment Committee,* R. C. McCarthy, Rockford, chairman; W. W. Larson, Rockford; Mrs. R. C. McCarthy, and Mrs. W. W. Larson; *Registration,* Leslie Sturch, chairman, Rockford; William Metcalf, Joliet; F. Barney, Rockford; *Ladies Committee,* Mesdames R. C. McCarthy, Earl Seaton, W. W. Larson, A. W. Overman, D. L. McCauslin, L. L. Sturch.

AMENDMENT TO THE NATIONAL CONSTITUTION AND BY-LAWS

PURSUANT to the action adopted at the national convention in Buffalo on November 4th, 1938 in acting favorably upon the recommendation of the Resolutions Committee that the constitution of the National Society be changed to provide for an increase in the number of Board of Directors from five to seven, the matter will be acted upon by the Sixth Annual Convention to be held in Chicago—January 15th to 18th.

The convention will be requested to vote on Section 2, Article VIII of the constitution, which provides, "There shall be a Board of Directors which shall consist of the officers and five (*increase to seven*) certificate or active members elected by ballot at the annual meeting of the association, and who shall hold office for one year or until their successors are elected and qualified."

October 1, 1939

H. T. McDermott, *National Secretary*

Chapter Notes

Under this heading will appear news of the chapter meetings. For names of the officers and dates of regular meeting nights, please refer to the Chapter Directory.

CENTRAL INDIANA CHAPTER

September 5th—The meeting was held in the Y.M.C.A. at Anderson, Indiana, but due to the extremely hot weather a very small attendance was present. Therefore, the greater part of the evening was spent in informal discussions and no official business

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of the chapter was discussed.

Announcement was made that the next meeting would be held at Marion, Indiana.

LONG BEACH CHAPTER

September 7th—The meeting got under way at the Willis Refrigeration Co., with President H. F. Voepel in charge. The usual routine of business was conducted in the usual manner and two new members were accepted to the chapter.

An interesting resumé of the refrigeration working code was given by Mr. E. Hogan.

President Voepel presented Past-president E. Gunsauls with a lapel button in appreciation of his efforts during the past year.

Two guests of the evening introduced by President Voepel were Mr. Blair of the Golden State Co., Ltd., and Mr. Paul Travers of the Moomaw Furniture Co. of Wilmington, Calif.

The educational program consisted of a trip through the Home Ice Co. and Polarink Ice Skating Palace. Views of the large ammonia plant for making ice and holding cold storage rooms, together with an explanation on the ammonia transfer to the ice rink next door were interesting parts of the trip.

More than thirty members took advantage of the trip and were very interested in the sights and the explanations given by Mr. George Eckerts of the Home Ice Co.

BOSTON CHAPTER

September 18th—President M. R. Handspicker called this meeting to order, and at the same time extended the welcome of the entire chapter to the ladies who were present. This was the first meeting to which the ladies have been invited.

Dinner was served and entertainment provided.

After a very sociable dinner the President called for the reading of the minutes of the last meeting. These were read by Secretary J. Minon and were accepted as read.

President Handspicker then discussed the matter of committees and it was decided that each member give special consideration to the nomination of members to sit on these committees, these nominations to be presented at the next meeting. This meeting was then called to an end, and music and

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motion pictures were provided for the entertainment of those present.

Approximately fifty persons were present, the ladies being very well represented, and all appeared to have an enjoyable time.

TWIN CITIES CHAPTER

September 11th—The meeting was called to order by President W. Warner, and the minutes of the previous meeting read and approved.

Some discussion regarding the certificate examination was held, but nothing was decided upon, the matter being held over until the October meeting.

The educational program of the evening consisted of a Quiz Contest conducted by the Educational Chairman with the outcome that Mr. C. E. Tupper won the first prize of a tube cutter and Mr. C. A. McCafferty won the second prize of a refrigeration wrench.

A name was drawn for the attendance prize, which has been built up to an interesting proportion due to the fact that the owners of the names drawn at the last several meetings were absent, and again the member was absent.

KANSAS CITY CHAPTER

July 11th—The meeting was called to order by Vice-President H. F. Andrews, and the regular routine of business conducted. Since there was no new business of interest to discuss, the meeting was turned over to the educational work for the evening.

Vice-President Andrews turned the meeting over to Mr. F. A. Thompson and Mr. F. C. Smith of the G. E. Supply Company, and those gentlemen explained in detail the servicing and repair on G. E. sealed and open type units.

The G. E. sealed unit that had been sent to the Kansas City Chapter by the National Educational Committee was taken apart and reassembled, and all present gained some worthwhile information. It is unfortunate that we could not have had a better attendance to have seen the G. E. unit.

After the G. E. demonstration the meeting was turned back to Mr. Andrews and duly adjourned.

August 8th—There was very little business to be conducted for the evening, and after the usual roll call and reading of the min-

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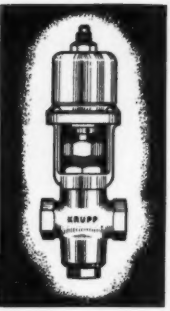

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utes, President J. DeWilde turned the meeting over to Educational Chairman H. F. Andrews.

Mr. Andrews conducted a round-table discussion by the members concerning various problems and new ideas. Much valuable information was derived from this exchange and many worthwhile suggestions given for improvements in servicing.

The meeting was turned back to President DeWilde who, after conducting another short business session, adjourned the meeting for the evening.

September 12th—Mr. Andrews reported that arrangements had been made for an outside speaker to attend the next meeting and that plans were being formulated for another weiner roast to be held by the chapter in the near future.

Mr. Tramposh gave a few interesting remarks on the subject of increasing the chapter membership.

President DeWilde introduced several visitors for the evening and invited them to join the chapter.

The meeting was then turned over to Mr. Andrews who introduced Mr. L. H. Roberts of the Fairbanks Morse Co. Mr. Roberts gave a nice talk in regard to the resemblance between air conditioning service and commercial refrigeration service.

PITTSBURGH CHAPTER

September 8th—The meeting was held in Stouffer's Restaurant, where dinner was served prior to the meeting.

A short business meeting followed the dinner. The minutes of the June meeting and the July and August social affairs were read by Secretary F. V. Golitz.

A discussion of the examination for certificate membership resulted in the decision to have Mr. N. D. Wagener outline a course for those who wish to review the theory before taking the examination.

The proposed city code was discussed at length.

President E. V. Black introduced Mr. George H. Clark of the Square D Company. Mr. Clark presented a moving picture of the Square D plant and laboratory. He also demonstrated the new capacity booster valve. At the conclusion of his talk, Mr. Black thanked him for his fine program.

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Results Mean Most—

Select fin coils on the basis of final results in your installation and free your mind and pocket-book of the grief of "trouble". We make them without capacity-destroying wrinkles, test them, dehydrate them, seal them—so you can be *sure* they're right. Write for free data.

REMPE FIN COILS

REMPE CO., 340 N. Sacramento Blvd., CHICAGO

Also stocked by Leo S. Bosarge Co., 315 Spring St., N. W., Atlanta, Ga.

LOS ANGELES CHAPTER

August 1st—President J. C. Rodgers called the meeting to order at Scully's Cafe and conducted the usual business of the evening, after which six new members were welcomed to membership in the chapter.

The President then introduced Mr. Wicks of the Heating and Ventilating Department of Los Angeles. Mr. Wicks gave some interesting facts regarding city licensing requirements and qualifications as required by all refrigeration service operators.

DAYTON CHAPTER

September 15th—Due to the extremely hot weather of the evening a rather small attendance was present for the meeting and business was, therefore, dispensed with and the meeting turned over to informal discussions and an impromptu social evening.

Announcement was made that the next meeting would be held on October 13th at Kiefaber's club room and that Mr. George H. Clark of the Square D Company would be present. It was also announced that arrangements are being made to serve refreshments following the meeting.

MONTGOMERY CHAPTER

August 24th—The meeting was called to order with a fair attendance present, considering the hot weather and the rush of work at this time. It is difficult to get good attendance during the summer months, and considerable time was devoted to a discussion of how to get the men out.

September 2nd—The meeting came to order at eight p.m. and the usual chapter business was conducted.

During the course of discussions, the subject of a future party came up and the question of whether it should be made a stag or whether the ladies should be invited. Nothing definite was decided at this time and future plans were held over until the next meeting.

The remainder of the evening was spent in round-table discussions on how working conditions in the territory could be improved.

September 9th—The meeting was held at M. B. Howard's place, with a fair representation of the chapter present. Some discussion of the forthcoming election of officers was held but nothing definite was planned.

THEY'RE ALL GOING THAWZONE . . .

BECAUSE: The pioneer fluid dehydrant goes to the root of the moisture problem. The active agent of THAWZONE combines chemically with water. It also combines chemically at the same time with any acid present.

That's the way those two trouble-makers, water and acid, are eliminated by THAWZONE. Because of the chemical action, a little does the job. Use only 1/2 of an oz. per lb., of refrigerant. At Leading Jobbers in the U. S. and Canada.

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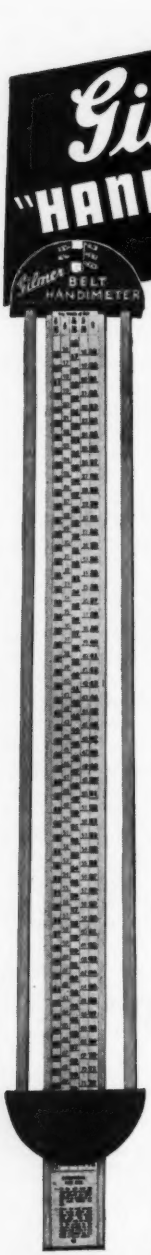
Newark, New Jersey



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2. 35 Gilmer Belts on circular tower stand.
3. Combination display sign, with perpetual inventory form.
4. Complete Gilmer Catalog, "America's Belt Bible" and 1 window display card in colors.

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L. H. GILMER COMPANY

TACONY, PHILADELPHIA

Announcement was made of the social evening to be held in the near future.

WICHITA CHAPTER

September 2nd—Due to the small attendance at this meeting, all business for the evening was deferred until the next meeting at which it was hoped the quorum would be present.

The balance of the evening was devoted to informal discussions and more or less of a social gathering, and the meeting adjourned at an early hour.

S S S

TRI-STATE LADIES AUXILIARY

THE Tri-State Ladies Auxiliary and the men were entertained with a dinner given by Mr. and Mrs. C. A. Brunton at their home, on September 26th. After the dinner the men adjourned to their meeting place for their meeting and the ladies held their meeting and election of officers.

The Auxiliary was very glad to have a new member, Mrs. James Cottle, join the organization. Mrs. Cottle is the recent bride of James Cottle, an employee of Claude Brunton and is a former resident of Dayton, Ohio.

The new officers of the Auxiliary are as follows: *President* — Mrs. A. V. Gruber; *Vice-President*—Mrs. Forrest Poole; *Secy. and Treasurer* — Mrs. James Cottle; *Sergeant-at-Arms*—Mrs. Carl Ackley; *Directors* —Mrs. D. M. Young; Mrs. M. E. Harrison; Mrs. A. W. Albertson; Mrs. Roy McElhany and Mrs. John Smoot.

Plans are being made to have a more entertaining and educational program for the coming year.

S S S

KANSAS CITY LADIES AUXILIARY

THE meeting of July 11th was called to order by Mrs. O. R. Irwin, the president. It was agreed by the members present that the Auxiliary contribute to the "Penny Ice Fund" and the Treasurer was instructed to mail the contribution to their headquarters.

A report on the sale of pictures of the dinner-dance party held in June showed a $1.50 profit and two pictures remaining unsold.

The meeting was turned over to the Entertainment Committee. After the "bank night" drawing, which was won by Mrs. Meeker, games were enjoyed by all.

A committee of three was appointed to furnish entertainment for the next meeting.

On August 8th no business meeting was held, the evening being spent in entertainment. Ten members and one visitor were present.

Mrs. Dunn won the "bank night" drawing.

S S S

TRICO SERVICE IN NEW LOCATION

TRICO Compressor Service has moved to larger quarters at 169 Racine Ave., Chicago, Ill.

Increased business in the repairing and overhauling of compressors, stated A. E. Karlberg, president of the company, made the move necessary. Added facilities will make possible faster service.

S S S

"EYE-FUL" TOWER FEATURES GILMER MERCHANDISER

THE "eye-ful" Tower Merchandiser just announced by the L. H. Gilmer Co., features their new "Handimeter" and "Eye-ful" Tower, and an assortment of 35 belts in popular sizes.

GILMER BELT MERCHANDISER

The Handimeter is a slide-rule type of measurer that gives the width and length of any V-belt up to 75 inches long and between 3/8 inches and 3/4 inches wide, which includes the majority of belts for small drives.

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REFRIGERANTS

Known the world over for dependability and availability.

EXTRA DRY
ESOTOO
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Re-assembling a G. E. monitor top, Model D-50-B-26 (Commercial Unit) in our shop

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THERMOSTATIC CONTROLS
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Precision work by experts. Years of satisfied customers, among the largest in the country. *All work guaranteed.* TRY US and be convinced. The largest thermostatic repair service in the country. IT'S YOUR GUARANTEE. *Prices on request.*

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COLTROL
POSITIVE CONTROL
LIQUID COOLERS

COMMERCIAL COIL and
REFRIGERATION CO.
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The "Eye-ful" Tower is a circular stand of sturdy wire, finished in dark blue. It is 15 inches in diameter at the base, by 32½ inches high, and has capacity for 70 belts.

A perpetual inventory card fits in the frame back of the sign, and offers a simplified, handy method for keeping record of belt stock.

The assortment consists of 35 V-belts, chosen especially for use on electric refrigerators, stokers, oil burners, pumps, compressors and numerous other small drives. Included is the Gilmer Catalog, and a window sign in colors. The assortment comes complete in a carton, ready to set up and sell.

NEW HEAD-BACK PRESSURE CALCULATOR IS HANDY REFRIGERATION TOOL

A NEW calculator known as Wright's Head-Back Pressure Calculator has just been placed on the market and is offered for sale by Nickerson & Collins Co., publishers of THE REFRIGERATION SERVICE ENGINEER.

A NEW CALCULATOR AT $1.00

The new calculator is designed for the quick determination, among other things, of the proper head pressure under which the refrigerating system should operate. When the proper pressure is found it may be compared to the existing pressure under which the system is operating, thus giving the service engineer another tool which will be found invaluable in the location of troubles in the system.

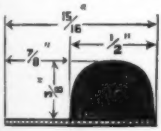
The calculator lists seven of the most popular refrigerants used and provides space for such information as:

Suction Temperature; Back Pressure; Room Temperature; Mean Water Temperature; Condensing Temperature and Head Pressure.

In addition the calculator may be used as a temperature-pressure relation chart and on the reverse side to that shown in Fig. 1, is a list of recommended cabinet and evaporator temperatures for various applications.

This useful tool, together with complete instructions and examples of its use is now available at $1.00. It is designed with full consideration for the type of usage it will have in the service field, being sturdily constructed and thoroughly protected with an oil-resistant coating which makes it easily cleaned by ordinary washing means.

NEW JARROW GASKETS



DIMENSIONS OF GASKET

NEW in the line of Refrigerator Door Gaskets, is a gasket which, according to laboratory tests made by the manufacturer, is 100 percent resistant to animal, vegetable and mineral oils, fats and greases. The gasket is also highly resistant to most acids, and has a very good resistance to abrasive wear.

Designed to be placed on cold storage doors where ordinary gaskets become gummy and tacky, the new gasket is the result of long experimentation in the rubber field. Its secret is the successful bonding of synthetic rubber covering to a sponge rubber core. It is now being developed for smaller equipment.

Samples for tests can be had from the manufacturers, Jarrow Products Corporation, 420 N. LaSalle Street, Chicago, Ill.

CHANNON TO OPERATE AS SEPARATE ENTITY

H. CHANNON COMPANY, Chicago, one of the country's largest distributors of industrial, contractors', railroad and refrigeration supplies, will continue to operate as an individual organization following

GENERAL CONTROLS

SINGLE SEATED VALVE K-20-5

for controlling refrigerants

Specify General Controls K-20-5 to obtain these advantageous features: positive control of refrigerants; no A.C. hum; current failure; packless construction; simplicity of design; trouble-free service. Also ideal for controlling air, gas, water, light oil.

SEND FOR 1939 CATALOG

GENERAL CONTROLS

267-5th Ave., New York City — 450 E. Ohio St., Chicago, Illinois

LEAK DETECTOR

3 Tools in One

1. LEAK DETECTOR
2. SOLDERING IRON
3. BLOW TORCH

This Halide Leak Detector accurately detects Freon-12, Carrene and other *non-combustible* halide refrigerant gases.

BURNS GASOLINE, BENZINE OR NAPHTHA but not alcohol. Flame can be adjusted as desired. No pump—no pressure system. Easily converted from detector to soldering iron or torch.

10¾" Overall
Weighs 1¾ Lbs.
Burns 30 to 45 Min.

ONLY $4.95 COMPLETE

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Canada's
Fastest Growing Parts Company Serving the Canadian Serviceman To-day.

- Valves
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WORLD'S LARGEST Hermetic Rebuilders

MAJESTIC, GRUNOW, GENERAL ELECTRIC, COLD SPOT, SERVEL, GIBSON, AND WESTINGHOUSE rebuilding. World's largest rebuilders. Prices $30.00 with 18 months' guaranty. Parts for Majestics and Grunows. GE floats $2.95. GE Streamliners $1.50. GE Discharge valves $.50. Westinghouse flapper valves $1.00. ⅙ H.P. Majestic capacitor motors $3.75. Write for catalog. ⅙ to 3 H.P. new motors—40% off.

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1939 is scheduled to be the best year yet. We will publish articles more practical, more informative, and more helpful to you, than ever before.

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435 N. Waller Ave., Chicago, Ill.

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COMMERCIAL LINE refrigerator display cases, walk-in coolers, and refrigerators; also direct draw, mechanically-cooled beer coolers. Sell with Ehrlich compressors or with any other make. Attractive discounts, also financing arrangements to help sell. 70 years in business. Write for full information. Ehrlich Refrigerator Mfg. Co., St. Joseph, Mo.

AIR CONDITIONING SIMPLIFIED—With the Air Condition Calculator. Everyone in the industry should have one. Eliminates the psychrometric chart. See April '38 R. S. E. page 30. Postpaid $1.50, write Nickerson & Collins Co., 435 N. Waller Ave., Chicago, Ill.

COLD CONTROLS & EXPANSION VALVES
repaired or exchanged
at the following prices, F.O.B. Chicago

Automatic Expansion Valves (All Makes)	$1.25
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ALL WORK GUARANTEED FOR 90 DAYS
Write for quantity prices
NEW DUTY
2424 Irving Park Blvd., CHICAGO

64 years of uninterrupted service to middle western industries.

This news became public at the same time announcement was made of the successful completion of the deal whereby Hibbard, Spencer, Bartlett & Co., Incorporated, acquired ownership of the Channon business. It was made known that holders of 98.4 per cent of the old Channon preferred stock and 96.3 per cent of the common had accepted the HSBCO purchase offer on August 31, the dead line, and that a release had been obtained from the Channon Company's lia-

RALPH E. KRAMER

bility for rent on the property it occupied at Randolph Street and Wacker Drive for the remainder of the term of lease—which was another stipulation of the HSBCO offer.

Kramer to Head Firm

Ralph E. Kramer continues to head the H. Channon Company as president and the Channon Company functions as a separate corporation with its own officers, board of directors, executive, sales and purchasing

Adams Engineering Co.

offers

immediate replacement from our stock of General Electric and Westinghouse.

Guaranteed units—

lowest prices.

Write or wire

2074 Webster Ave., New York, N. Y.

personnel. In fact, practically all members of the Channon Company under the old ownership remain with the organization, including J. C. Douglas, who will continue as sales manager.

President Kramer announces an expansion in all departments and facilities through removal of offices and warehouse to new quarters at 201 East North Water Street, which has been completed. According to Mr. Kramer, the number of items, breadth of lines and dollar value of inventories have been more than doubled and additions have been made to both service and merchandising organizations. He emphasizes the fact, however, that the Channon Company will maintain its own inventory and its own purchasing department and continue with the manufacturers' lines it has been handling.

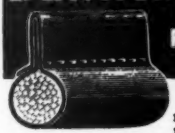
On the other hand, through its new set-up, the Channon Company expects to effect definite operating economies because of lower charges for power, heat, water, light, rent and taxes and elimination of inventory duplication, as well as increased buying power.

"At the same time," said Mr. Kramer, "we should benefit definitely from having the full resources of Hibbard, Spencer and Bartlett behind us. This tie-up will add great financial strength and stability, and the increased inventories that we will have available will enable us to expand our merchandising activities notably. Furthermore, we will now be in a position to broaden our efforts at sales promotion, which I believe is very essential to the conduct of a successful supply business today."

And so the H. Channon Company, which was founded in 1875 and has been a vital factor in the industrial development of the middle west ever since, enters a new era which its executives are confident marks another step forward in the continuous development of this well known concern.

DENNIS GASKETS

FOR ALL MAKES REFRIGERATOR DOORS



A complete line of rubber - coated, packed Gaskets and extruded rubber Gaskets that last longer —retain higher efficiency—because made of finest materials and workmanship. Write for free samples, giving your jobber's name and address.

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HERMETIC REBUILDING SERVICE

G.E.—Westinghouse and Majestic

Customers in 37 states had hermetically sealed units rebuilt or exchanged by us in the past year. Complete factory equipment for precision rebuilding. One year guarantee on all rebuilt units. Exchange service available on most makes and models. Write for prices and descriptive literature.

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BRONZE BEARINGS
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Jarrow Replacement Door Gaskets

546

The gasket illustrated was made especially for Apex, Crosley, Stewart-Warner, and Trupar replacement. It fits. ALL JARROW gaskets are built to Manufacturers' specifications. INSIST on JARROW gaskets. Your nearest Jobber has them.

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420 N. LaSalle St., Chicago, Ill.

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THE DOUBLE SECURITY OF THE SYLPHON
PLUS A GOOD SPRING LOADED PACKING
Phosphor bronze disc reinforces top of Sylphon
Swivel button relieves twisting strain from sylphon.
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60° seat assures a positive and easy seating action.
All seats protected with lead protectors until used.
ORDER FROM YOUR JOBBER
Raised portions of base form socket which takes twisting strains when wrench is used on valve.
IMPERIAL Air Conditioning and Refrigeration Products
THE IMPERIAL BRASS MFG. CO., 1804 W. Harrison St., Chicago

It's easy to spot what's wrong, with this handy trouble-shooter

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HEAD-BACK PRESSURE
CALCULATOR

The purpose of the Head-Back Pressure Calculator is to quickly determine the proper head pressure, for the following refrigerants when the suction pressure, room temperature or mean water temperature is known.

Carrene	Methyl
Isobutane	Freon or F-12
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A number of troubles can be detected by comparison of the existing head pressure and what the head pressure should be, but in the past there has been no convenient method available to the service engineer to determine what the correct head pressure should be. Such variable conditions as the suction pressure, room temperature, water inlet and outlet temperature, kind of gas used, etc., all determine the proper head pressure. It is not practical to depend on one's memory of other similar conditions or to just use snap judgment when this handy calculator gives you the correct answer so easily. Send for it today! Sturdily constructed, with oil-proof finish, for on-the-job use.

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I'm getting additional business servicing
Meter-Misers
with

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"Business I formerly turned down, I'm getting now. My thanks to HERVEEN—the ideal replacement gas for Meter-Misers."

Every day more service men are profiting by additional business, because HERVEEN has opened the way to Meter-Miser servicing.

It's been proven in actual service. You can use it with assurance.

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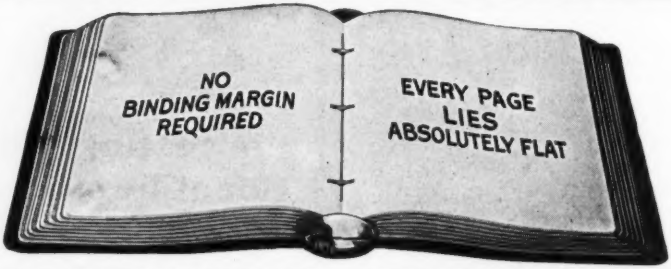

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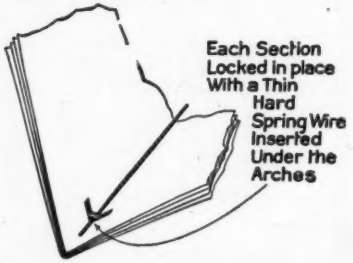

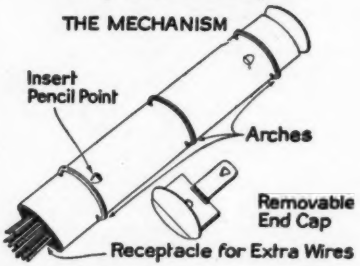

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THE SPIRIT OF '39

(To the tune of "*Yankee Doodle*")

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Their business volume's double!
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Have no more service trouble.

Give your trade more Henry jobs
And watch your sales-curve rocket.
They'll put a feather in your cap,
And money in your pocket.

HENRY

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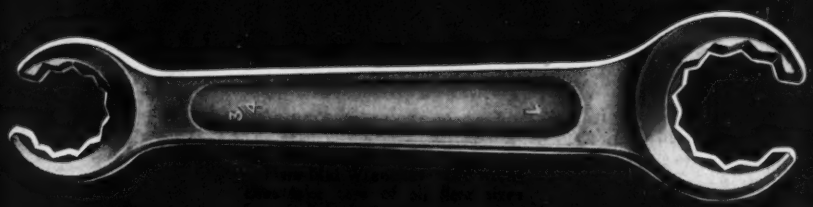

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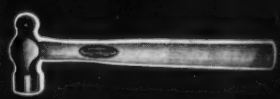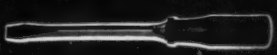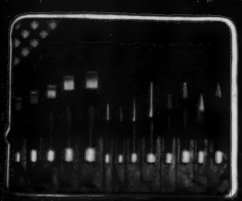
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